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DATAMATION

JUNE 15, 1982
A CAHNERS PUBLICATION
ZDM EDITION

SPECIAL REPORT

The Datamation 100

DATAMATION

NEWS

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For the top companies in the dp industry, 1986 contained a pinch of this and a dash of that: revenues went up, profits went down, but fewer companies lost money. The industry employed fewer people, while the falling dollar played a key role in the ascent of many companies' fortunes. For the world's top 100 computer companies, the till rang up $176.9 billion, an increase of 17% over 1985's total.

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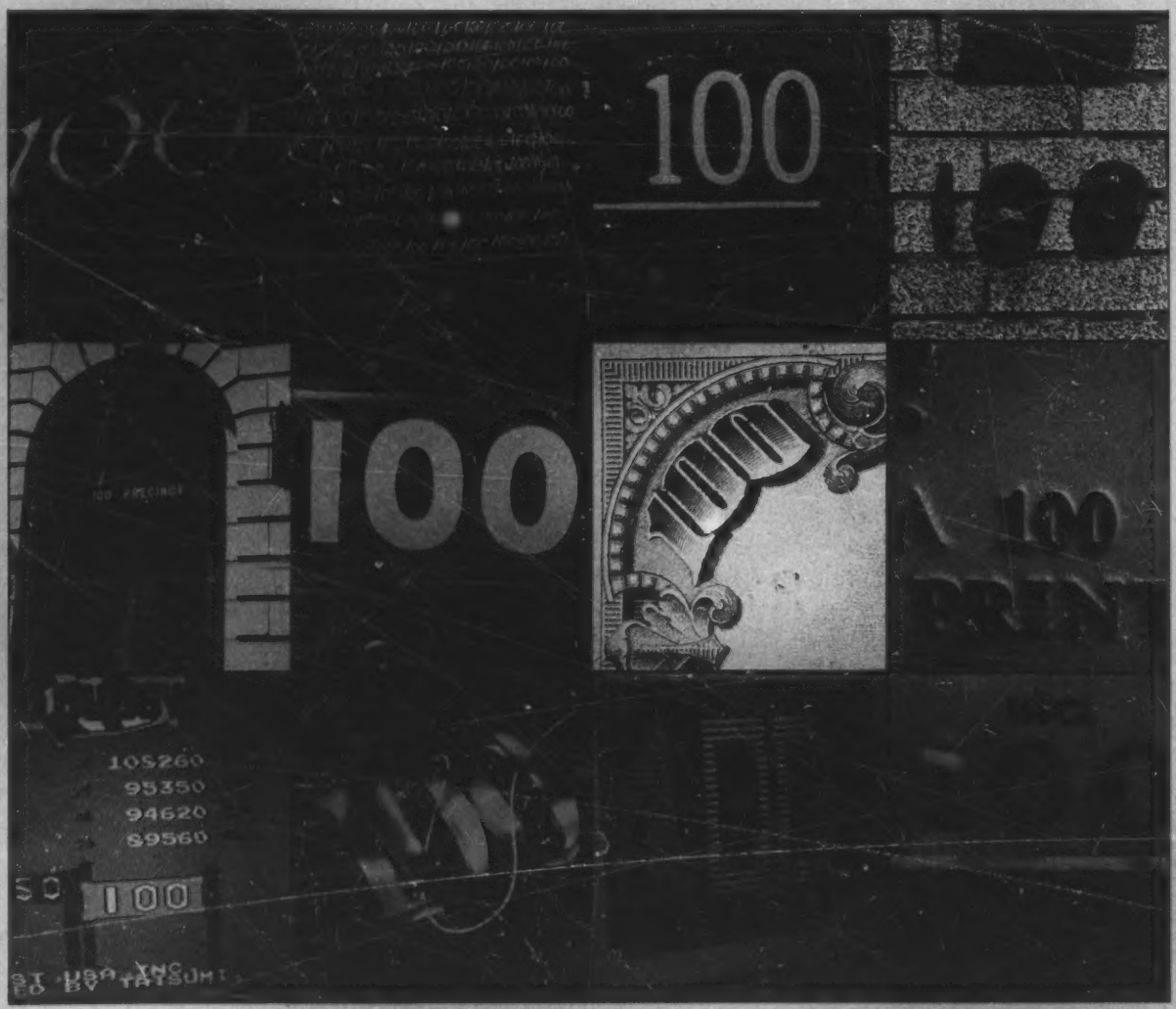

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-1 **Unix: Window of Opportunity?**
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Cover photographs by Paige Buffington, Steve Cooper, Lucien Flotte, James Joern, Michael Marks, Michael F. Nied, and Peter Angelo Simon

This issue marks the last in which the oem section will appear.

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Editorial

Industry Approaches $200 Billion Mark

Once upon a time, the rankings of the DATAMATION 100 changed little from year to year. Of course, as recently as five years ago, we were taking a pretty settled view of the world of data processing: the rankings were of U.S.-based companies only. Oh, Burroughs and Sperry would do-si-do in the fifth and sixth positions year after year. And, just five years ago in these pages, Digital Equipment Corp. managed to climb to the second rung of the dp ladder from the fourth, propelled by a hefty 30.7% growth in dp revenues for 1981 over 1980. In that same 1982 survey, IBM's dp revenues were up just 16.7%.

The top 10 companies were usually the same. You could count on IBM, DEC, CDC, NCR, Burroughs, Sperry, HP, Honeywell, and Xerox. (Vying for the 10th spot were Wang, Memorex, and StorageTek.) The 1982 DATAMATION 100 revealed that total revenues of those U.S.-based winners grew to $67.8 billion in 1981 from $55.6 billion in 1980—a healthy 21.9% increase.

Now we invite you in for a look at our 1987 DATAMATION 100, where dp revenues for the 100 chartbusters from around the world top $176.9 billion in U.S. dollars. That represents a 17% increase over dp revenues of last year's DATAMATION 100 winners.

As we now view data processing through global glasses, our line-up is a far cry from that of our survey just five years ago. For one thing, fully half of the top 10 companies are based outside the U.S. And no longer do Burroughs and Sperry jockey for position; united in Unisys, they combine to earn the second position in rank, bumping DEC to third.

So where is that slump we talked about all last year? Clearly, the slump was in the U.S. dollar. Because the DATAMATION 100 rankings are based on worldwide dp revenues translated into dollar values, a company based, for example, in Japan could easily boost its ranking in our survey by the sheer buying power of the yen. Toshiba's dp revenues, for instance, rose a respectable 15% when measured in yen; translated into dollar values, revenues soared 62%. Toshiba's ranking was elevated nicely too—from the 21st position to the lucky 13th spot.

Welcome to the world of data processing; it's a big world after all. We estimate that the dp revenues of the DATAMATION 100 represent 90% of total worldwide dp revenues, which, at $196.5 billion, means the industry is closing in on the $200 billion mark. ■

Rebecca S. Barna

REBECCA S. BARNA
EDITOR

The Datam

A DATAMATION STAFF REPORT

Ask what happened to the companies in the DATAMATION 100 last year, and fingers start pointing in every imaginable direction. Companies collapsed and blossomed; the dollar dimmed, helping and hurting; some markets cooled, while others heated up. For the top 100 companies in the dp business, total dp revenues were up handsomely to $176.9 billion, 17% over the total dp revenues of last year's DATAMATION 100.

Pointing in the other direction, total corporate profits of the companies on the roster headed down 4% to $25.7 billion. The chief culprit behind the profit picture was IBM. Earnings at Big Blue, which make up nearly a fifth of the total profits of the DATAMATION 100, fell 27% in 1986. (Remember also that many of the companies on the DATAMATION 100 are in more businesses than just dp: the figures for total profits are derived from total corporate revenues of parent companies, not just their dp entities. So the profits of a thriving dp operation—like EDS—are diminished by those of a sickly corporate parent—like GM.)

The companies that actually reported 1986 losses managed to tally up a large and depressing number. Twelve companies ended up in the red, ranging from Control Data's big $264.5 million loss to Computervision's $5.8 million. The total for the dirty dozen big losers: a whopping $655.2 million down the tubes.

And the dollar? It went thataway, its fall during 1986 altering the population of the top 100 companies, sending some companies soaring, shouldering others off the list entirely. For example, look at some Japanese companies. Because the DATAMATION 100 rankings are based on worldwide dp revenues translated into dollar values, a company headquartered in Japan could buy more cheap dollars with fewer yen. Toshiba's dp revenues were up 15% when measured in yen, but they skyrocket 62% when translated into dollars, elevating the company to rank 13 in this year's DATAMATION 100, up from 21 last year.

Still, the sagging greenback supported a lot of U.S. companies, particularly the biggest one. IBM's U.S. revenues were down by 11%, while its non-U.S. revenues were up 20%. In fact, IBM's U.S. business was down in every product category except software and maintenance. Foreign currency translations, however, raised foreign revenues to $4.37 billion, according to Bob Djurdjevic of Annex Research, Phoenix. Without a boost from the dollar's slump,

ation 100

It was a year of mixed results for the top companies in the dp industry. Revenues were up but fewer people had jobs. Profits were down, but fewer companies lost money. The falling dollar rearranged the ranking of the DATAMATION 100, moving some non-U.S.-based companies up the chart. Some U.S. multinationals also got a boost from the trials of the greenback.

The Datamation 100

IBM's 1986 revenues might have been down 6.3% instead of being up 2.3%.

But IBM's troubles are not necessarily contagious. The overall increase in dp revenues of about 17% for the DATAMATION 100 indicates that while IBM may be feeling peaked, there are plenty of robust companies in the industry. Things may still be tough, but companies with the right products, good timing of product cycles, and good management are proving that healthy sales are attainable.

Profiting from these sales is apparently more difficult. In 1984, 17 of the companies on the DATAMATION 100 had net profits that were 10% or more of total revenues. In 1985, that count fell to nine.

Last year, the number of 10-percenters stayed at that level. Still, there were some bright spots. Two companies shot over 20%, one of them newcomer to the list Microsoft, the other a longtime hot earner, Cray Research. Digital Equipment Corp.—the company that could do no wrong in 1986—also joined this happy group of overachievers, scoring profits of 10.24% of revenues. IBM, which had earned 13% of sales in 1985, could do no better last year than 9.34%. Still, that return on revenues put IBM ahead of all but 10 of the DATAMATION 100.

Belt-tightening was evident throughout the DATAMATION 100, most notably in personnel. At the end of 1986, the companies on the list employed a total of 6.63 million people, about 13,000 fewer than in 1985. With total sales up 17%, it is obvious that a lot of companies are finding they can sell more with fewer people.

Some companies cut staff severely. Among them was AT&T, which in December 1986 employed 26,600 fewer employees in all divisions than in December 1985. At the other end of the scale, Apple, having done most of its personnel surgery in 1985—when it cut its staff by 22%—was in the hiring mode again, growing by 42% to 5,940 by the end of 1986. In fact, Apple's hiring made the company 10% bigger than it had been in 1984, the most recent dp boom year.

Of the 10 top hirers (ranked by percent increase in total staff), three companies are primarily in the peripherals business, two are in software, two primarily in computer services, and there is one each in minicomputers, supercomputers, and microcomputers. Also boasting big percentage increases in staff size were the leasing company Comdisco, up 22% to 930 employees, and Olivetti, whose 21% increase to 59,091 was helped by some acquisitions. It seems no mere coincidence that most of the companies whose staffs increased markedly during 1986 concentrate on specific markets.

Likewise, in this year of contrasts, the companies that shrank most appear to be victims of diffuse strategies: Control Data Corp., AT&T, and Tektronix. Some of the other 1986 downsizers did so in order to focus their efforts: Gould and Harris both reorganized during the year. And some companies fell victim to overdependence on single, fickle oem customers, notably Convergent with AT&T.

Another company issuing fewer paychecks by the end of 1986 was IBM. While it employed only 2,027 fewer employees than in 1985, the turnaround marked the end of long, steady growth at the industry leader. For example, in 1981, IBM employed 354,936; in 1982, that number grew to 364,796; in 1983,

FIGURE 1 The Markets of the DATAMATION 100

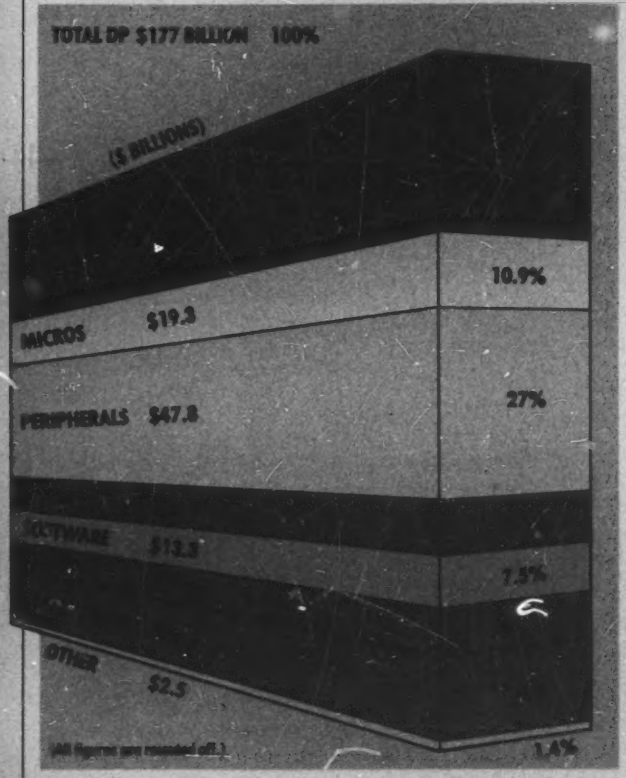


FIGURE 2 The Top 15 in Mainframes

DTM 100 RANK		COMPANY	1986 ($ MIL.)	1985 ($ MIL.)	$ % CHANGE*
1	1	IBM	14,450.0	14,010.0	3.1
2	4	Fujitsu Ltd.	2,469.7	1,618.6	52.6
3	5	NEC Corp.	2,274.9	1,216.6	87.0
4	2	Unisys Corp.	2,200.0	NA	NA
5	6	Hitachi Ltd.	1,371.4	836.8	63.9
6	3	Groupe Bull	821.9	574.3	43.1
7	20	Honeywell Inc.	740.0	775.0	-4.5
8	8	Siemens AG	582.9	374.1	55.8
9	56	Cray Research Inc.	525.5	332.6	58.0
10	36	Amdahl Corp.	497.6	434.0	14.7
11	22	STC plc	486.0	370.0	31.4
12	11	Control Data Corp.	400.0	531.0	-24.7
13	49	National Semiconductor	300.0	270.0	11.1
14	60	BASF	276.5	196.4	40.8
15	25	Mitsubishi Electric Corp.	184.6	130.7	41.2

■ Amid mixed signals Amdahl and National Semiconductor posted strong results in the final two quarters of the year.

*In local currency. Fujitsu's mainframe revenues were up 8% to ¥416.2 billion; NEC's were up 32.4% to ¥383.36 billion; Hitachi's were up 16% to ¥231.11 billion; Groupe Bull's were up 10.5% to FF5.69 billion; Siemens' were up 15% to DM1.27 billion; STC's were up 14.5% to £330.5 million; BASF's were up 3.9% to DM620 million; and Mitsubishi's were flat at ¥31.12 billion. NA: not applicable.

FIGURE 3 The Top 15 in Minis

	DTM 100 RANK	COMPANY	1986 ($ MIL.)	1985 ($ MIL.)	$ % CHANGE*
1	1	IBM	3,000.0	3,500.0	-14.3
2	3	Digital Equipment Corp.	2,000.0	1,600.0	25.0
3	7	Hewlett-Packard Co.	1,100.0	1,050.0	4.8
4	12	Wang Laboratories Inc.	804.7	786.0	2.4
5	13	Toshiba Corp.	765.5	499.8	53.2
6	4	Fujitsu Ltd.	620.2	439.0	41.3
7	2	Unisys Corp.	600.0	NA	NA
8	10	Olivetti SpA	492.5	348.6	41.3
9	25	Mitsubishi Electric Corp.	474.7	326.6	45.4
10	28	Data General Corp.	450.1	479.8	-6.2
11	17	Nixdorf Computer AG	414.7	407.9	1.7
12	9	NCR Corp.	366.5	357.0	2.7
13	75	Norsk Data AS	349.1	219.8	58.8
14	44	Tandem Computers Inc.	345.5	317.3	8.9
15	21	Philips	322.4	312.0	3.3

■ DEC's mini year was unforgettable, but missing from this year's list of mini market leaders is its Massachusetts neighbor, Prime.

*In local currency, Toshiba's mini revenues were up 8.4% to ¥129 billion; Fujitsu's were flat at ¥104.52 billion; Olivetti's were up 5.5% to L735.1 billion; Mitsubishi's were up 2.9% to ¥79.99 billion; Nixdorf's were down 25% to DM900 million; Norsk Data's were up 36.7% to NOK2.58 billion; and Philips' were down 23.8% to G790 million. NA: not applicable.

FIGURE 4 The Top 15 in Micros

	DTM 100 RANK	COMPANY	1986 ($ MIL.)	1985 ($ MIL.)	$ % CHANGE*
1	1	IBM	5,650.0	5,500.0	2.7
2	18	Apple Computer Inc.	1,781.0	1,603.0	11.1
3	10	Olivetti SpA	1,267.6	884.5	43.3
4	24	Tandy Corp.	997.0	796.8	25.1
5	2	Unisys Corp.	800.0	NA	NA
6	5	NEC Corp.	697.3	338.6	105.9
7	54	Compaq Computer Corp.	625.2	503.9	24.1
8	16	AT&T	600.0	500.0	20.0
9	13	Toshiba Corp.	581.5	289.8	100.7
10	58	Zenith Electronics Corp.	548.0	352.0	55.7
11	46	Commodore Int'l Ltd.	525.0	400.0	31.3
12	7	Hewlett-Packard Co.	450.0	400.0	12.5
13	15	Xerox Corp.	400.0	344.0	16.3
14	19	Matsushita Elec. Industr.	363.1	270.6	34.2
15	4	Fujitsu Ltd.	339.8	160.4	111.9

■ Apple's strong growth followed a weak 1985 in which micro sales had fallen 8.2%. Commodore continues to suffer from management chaos. Zenith makes a big move in micros.

*In local currency, Olivetti's micro revenues were up 7% to L1.892 trillion; NEC's were up 45.8% to ¥117.5 billion; Toshiba's were up 42% to ¥98 billion; Matsushita's were down 5% to ¥61.19 billion; and Fujitsu's were up 50% to ¥57.27 billion. NA: not applicable.

FIGURE 5 The Top 15 in Software

	DTM 100 RANK	COMPANY	1986 ($ MIL.)	1985 ($ MIL.)	$ % CHANGE*
1	1	IBM	5,514.0	4,165.0	32.4
2	2	Unisys Corp.	861.0	NA	NA
3	3	Digital Equipment Corp.	560.0	300.0	86.7
4	5	NEC Corp.	507.1	376.2	34.8
5	4	Fujitsu Ltd.	389.2	250.6	55.3
6	8	Siemens AG	387.1	221.1	75.1
7	7	Hewlett-Packard Co.	375.0	300.0	25.0
8	6	Hitachi Ltd.	331.0	202.0	63.9
9	17	Nixdorf Computer AG	299.5	192.0	56.0
10	89	Lotus Dev. Corp.	283.0	225.5	25.5
11	96	Microsoft Corp.	260.2	162.6	60.0
12	33	Compagnie Gén. d'Elec.	238.1	178.2	33.6
13	93	Computer Assoc. Int'l	226.5	143.7	57.6
14	10	Olivetti SpA	225.3	116.0	94.2
15	12	Wang Laboratories Inc.	200.0	157.0	27.4

■ Microsoft and Computer Associates joined Lotus as the only software "pure plays" on the DATAMATION 100.

*In local currency, NEC's software revenues were down 4.6% to ¥85.45 billion; Fujitsu's were up 10% to ¥65.59 billion; Siemens' were up 29.2% to DM840 million; Hitachi's were up 16% to ¥55.78 billion; CGE's were up 3% to FF1.65 billion; and Olivetti's were up 45% to L336.3 billion. NA: not applicable.

FIGURE 6 The Top 15 in Services

	DTM 100 RANK	COMPANY	1986 ($ MIL.)	1985 ($ MIL.)	$ % CHANGE*
1	23	TRW Inc.	1,450.0	1,275.0	13.7
2	27	ADP Inc.	1,298.1	1,102.1	17.8
3	31	General Motors Corp.	1,125.9	978.3	15.1
4	35	Computer Sciences Corp.	977.7	800.7	22.1
5	29	McDonnell Douglas	803.2	650.0	23.6
6	11	Control Data Corp.	752.0	1,058.7	-29.0
7	53	Martin Marietta	659.4	564.4	16.8
8	30	Nippon Teleg. & Teleph.	577.6	382.0	51.2
9	39	General Electric Co.	550.0	950.0	-42.1
10	59	Arthur Andersen	546.0	414.7	31.7
11	66	Cap Gemini Sogeti	419.9	245.1	71.3
12	9	NCR Corp.	350.0	300.0	16.7
13	84	Boeing Co.	300.0	270.0	11.1
14	1	IBM	300.0	300.0	NC
15	94	Nomura Comp. Sys. Co.	263.5	151.7	73.7

■ The services sector is the only dp market in which IBM does not take the top slot. EDS is the muscle in General Motors' good showing in the segment.

*In local currency, NTT's services revenues were up 7% to ¥97.33 billion; Cap Gemini Sogeti's were up 32.3% to FF2.91 billion; and Nomura's were up 23% to ¥44.41 billion. NC: no change.

FIGURE 7 The Top 10 in Peripherals

	DTM 100 RANK	COMPANY	1986 ($ MIL.)	1985 ($ MIL.)	$ % CHANGE*
1	1	IBM	11,264.0	12,676.0	-11.1
2	3	Digital Equipment Corp.	3,100.0	2,750.0	12.7
3	2	Unisys Corp.	2,500.0	NA	NA
4	6	Hitachi Ltd.	2,321.9	1,416.7	63.9
5	5	NEC Corp.	1,774.8	1,053.3	68.5
6	4	Fujitsu Ltd.	1,624.1	1,064.3	52.6
7	9	NCR Corp.	1,564.7	1,393.9	12.3
8	7	Hewlett-Packard Co.	1,525.0	1,373.0	11.1
9	11	Control Data Corp.	1,380.0	1,270.0	8.7
10	15	Xerox Corp.	1,300.0	1,265.0	2.8

■ Control Data began a comeback in 1986, after a 1985 drop in peripherals sales. IBM's falling revenues were yet another symptom of troubled system sales.

*In local currency, Hitachi's peripherals revenues were up 16% to ¥391.28 billion; NEC's were up 19.3% to ¥299.09 billion; and Fujitsu's were up 8% to ¥273.69 billion. NA: not applicable.

FIGURE 8 The Top 10 in Datacom

	DTM 100 RANK	COMPANY	1986 ($ MIL.)	1985 ($MIL.)	$ % CHANGE*
1	1	IBM	2,000.0	2,300.0	-13.0
2	8	Siemens AG	1,096.8	785.6	39.6
3	16	AT&T	1,075.0	1,050.0	2.4
4	38	Northern Telecom Ltd.	800.0	800.0	NC
5	5	NEC Corp.	768.0	443.9	68.5
6	13	Toshiba Corp.	534.1	378.0	41.3
7	4	Fujitsu Ltd.	531.0	375.8	41.3
8	33	Compagnie Gén. d'Elec.	523.5	378.8	38.2
9	26	LM Ericsson	519.7	476.8	9.0
10	19	Matsushita Elec. Industr.	478.5	365.2	31.0

■ Mirroring the slowdown in computer sales, datacom sales were off at IBM, AT&T, and Northern Telecom.

*In local currency, Siemens' datacom revenues were up 3% to DM2.38 billion; NEC's were up 19.3% to ¥126.05 billion; Toshiba's were flat at ¥90 billion; Fujitsu's were flat at ¥89.48 billion; CGE's were up 6.71% to FF3.63 billion; Ericsson's were down 9.8% to SKr3.7 billion; and Matsushita's were down 7.3% to ¥80.63 billion. NC: no change.

FIGURE 9 Growth Spurts

RANKED BY % INCREASE IN DP REVENUE

	DTM 100 RANK	COMPANY	DP REV. IN LOCAL CURRENCY (MIL.) 1986	1985	% INCREASE
1	57	Lockheed Corp.	$551.0	$113.3	386.3
2	50	Seagate Technology	$709.4	$303.6	133.7
3	76	Sun Microsystems Inc.	$341.1	$147.1	131.9
4	67	Xidex Corp.	$418.3	$232.8	79.7
5	65	Atlantic Computers plc	£293.1	£175.0	67.5
6	96	*Microsoft Corp.	$260.2	$162.6	60.0
7	56	Cray Research Inc.	$596.7	$380.2	56.9
8	58	Zenith Electronics Corp.	$548.0	$352.0	55.7
9	93	Computer Assoc. Int'l	$264.9	$170.4	55.5
10	100	Recognition Eqpt.	$246.6	$163.1	51.2

■ Lockheed bought its way onto this list acquiring Sanders Associates, number 71 on last year's DATAMATION 100.

FIGURE 10 Falling Fortunes

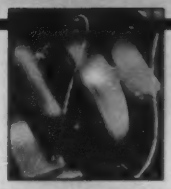
RANKED BY % DECLINE IN DP REVENUE

	DTM 100 RANK	COMPANY	DP REV. IN LOCAL CURRENCY (MIL.) 1986	1985	% DECREASE
1	83	Convergent Tech.	$305.8	$459.3	33.4
2	42	Oki Electric Ind.	¥148,224.0	¥211,995.0	30.1
3	39	General Electric Co.	$900.0	$1,130.0	20.4
4	79	Datapoint Corp.	$325.0	$404.2	19.6
5	45	C. Itoh & Co. Ltd.	¥136,288.0	¥168,091.0	18.9
6	97	3M	$255.0	$295.4	13.7
7	26	LM Ericsson	SKr9,571.0	SKr10,561.0	9.4
8	11	Control Data Corp.	$3,346.7	$3,679.7	9.0
9	88	Sony Corp.	¥48,054.0	¥52,806.6	9.0
10	73	Dataproducts Corp.	$350.8	$370.6	5.3

■ Almost half of Convergent's 1986 drop in business was a result of falling orders from big customer AT&T.

employment was up to 369,545; in 1984, more than 25,000 were added, jumping total employment to 394,930; and in 1985, at its peak, IBM was paying 405,535 people. Last year, shrinking profits and flat sales decreed a slimmer behemoth in Armonk.

Nevertheless, growth and prosperity are present in the DATAMATION 100; Redmond, Wash.-based Microsoft and Nomura Computer Systems and CSK Corp., both in Tokyo, are not the only debutants on this year's list. Other newcomers include Sun Microsystems Inc., the Mountain View, Calif., workstation company; Continental Information Systems and United Leasing of England, both in the computer leasing business; Recognition Equipment an Irving, Texas, specialist in data entry equipment; Computer Associates, the mainframe software company in Garden City, N.Y.; and Samsung, the first Korean company to make the worldwide dp big time. A fast-selling PC clone and a steadily growing peripherals market helped buy Seiko Epson a place; and Bell Atlantic became



The Datamation 100

FIGURE 11 Lucky 13

THE COMPANIES WITH THE HIGHEST RETURN ON SALES

	DTM 100 RANK	COMPANY	1986 % NET RETURN ON SALES	1985 % NET RETURN ON SALES
1	96	Microsoft Corp.	22.1	19.2
2	56	Cray Research Inc.	20.9	19.9
3	75	Norsk Data AS	18.1	19.3
4	89	Lotus Development Corp.	17.1	16.9
5	50	Seagate Technology	12.7	2.9
6	81	Bell Atlantic Corp.	11.8	12.0
7	55	Intergraph Corp.	11.6	12.9
8	93	Computer Assoc. Int'l	11.5	9.9
9	3	Digital Equipment Corp.	10.2	5.7
10	44	Tandem Computers Inc.	9.5	5.0
11	1	IBM	9.3	13.1
12	97	3M	9.1	8.5
13	48	Telex Corp.	8.9	9.8

■ Is Gates a genius? Can DEC do no wrong? Computers aren't the only super thing about Cray. And Bell Atlantic Corp. beats its ex-parent into the winners' circle.

FIGURE 12 Dirty Dozen

12 WHO LOST MONEY

	DTM 100 RANK	1985 RANK	COMPANY	1986 EARNINGS LOSS ($ MIL.)	1985 EARNINGS LOSS/GAIN ($ MIL.)
1	11	8	Control Data Corp.	264.5	567.5
2	86	80	Gould Inc.	101.8	175.7
3	12	13	Wang Laboratories Inc.	86.4	63.3
4	49	46	National Semiconductor	53.6	89.5
5	95	85	Paradyne Corp.	38.5	31.2
6	83	60	Convergent Tech.	32.8	+13.2
7	28	28	Data General Corp.	26.8	+1.7
8	42	34	Oki Electric*	14.8	6.6
9	99	102	Eaton Corp.	10.2	+80.5
10	46	41	Commodore Int'l Ltd.	10.0	237.2
11	58	67	Zenith Electronics Corp.	10.0	7.7
12	81	57	Computervision Corp.	5.8	80.8

■ The 12 losingest companies on this year's DATAMATION 100 racked up losses of $655.2 million, an improvement over last year, when the dirty dozen lost $1.76 billion.

*In local currency, Oki's loss was ¥2.49 billion.

the first of the regional Bell operating companies to join ex-parent AT&T on the list.

Comparing the products sold by the companies of the 1986 DATAMATION 100 to those sold by the 1985 industry leaders reveals that peripherals still make up the largest piece of the business. Fully 27% of total dollar sales are generated by peripherals. This is down very slightly from 1985 when 27.3% of sales were peripherals. Indeed, except for data equipment and microcomputers, all hardware categories—while growing in dollar amounts—took slightly smaller pieces of the total pie in 1986.

Big winners were services, up to 6.7% last year from 1985's 5.7%; and maintenance, up to 13.3% from 11.6%. Maintenance was one of the few market segments in which IBM increased sales in 1986. Another was software, which for the industry as a whole stayed about flat at 7.5% of the total dollar.

The drooping dollar altered the lineup of the top sellers in various market segments. In mainframes, for example, Fujitsu was hoisted into second place by exchange rates. Had the dollar maintained its 1985 strength, second place would have belonged to newborn Unisys, a lineal descendent of last year's mainframe runner-up, Sperry.

Unlike 1985, when every company in the mainframe segment scored some growth, a few mainframe marketeers had diminished sales in 1986: mainframe revenues for Honeywell, Control Data, NCR, Nippon Univac Kaisha, and Nokia all were off when measured in their local currencies.

It should come as no surprise that the big success story in the minicomputer market in 1985 was DEC, with sales up a solid 25%. IBM wasn't looking so good, its fixes in the midrange not coming soon enough or strong enough to prevent a 14% drop in 1986 mini revenues. Other losers in this category were Nixdorf, off almost 25% measured in deutschmarks; Philips, off about 24% in guilders; Nippon Univac Kaisha, off almost 12% in yen; and Ericsson, off more than 9% in krona.

Companies in the microcomputer market looked good, with only a few showing lower sales in local currency than the previous year, specifically Ericsson, Matsushita, and Philips.

Apple reversed its slide, marking a healthy 11% comeback over 1985. Big increases—again, in local currency—were scored by NEC, Toshiba, Fujitsu, Seiko Epson, Zenith, Tandy, Compaq, and NCR. Market leader IBM managed a slight increase—2.3%—after two years of flat micro sales. ■

Methodology

Throughout the year, DATAMATION collects information on more than 200 companies worldwide. The companies are then ranked on the basis of their data processing revenues for the calendar year. All revenue and earnings figures in the current DATAMATION 100 are for calendar year 1986. Because many companies operate on a fiscal year that does not coincide with the calendar year, some data, such as expenditures on research and development, are reported as of the company's most recent fiscal year-end.

For the purposes of the DATAMATION 100 survey, data processing revenues are defined as being derived from sales of the following: computer systems, including mainframes, minicomputers, microcomputers and personal computers, workstations, word processors, office systems, and CAD/CAM systems; peripherals, including terminals, printers, plotters, disk drives, tape drives, magnetic media, and data entry devices; software, including operating systems and applications programs; data communications equipment, including communications processors, local area networks, digital PBXs, multiplexors, modems, and facsimile machines; data services, including custom programming, systems integration, consulting, time-

CIRCLE 18 ON READER CARD

FIGURE 13 The Big Hirers

RANKED BY PERCENT ADDITION IN STAFF

	DTM 100 RANK	COMPANY	1986 EMPLS.	1985 EMPLS.	% INCREASE
1	67	Xidex Corp.	6,500	3,650	78.1
2	50	Seagate Technology	11,872	7,026	69.0
3	96	Microsoft Corp.	1,500	910	64.8
4	93	Computer Assoc. Int'l	2,400	1,600	50.0
5	66	Cap Gemini Sogeti	7,500	5,200	44.2
6	18	Apple Computer Inc.	5,940	4,182	42.0
7	70	AGS Computers Inc.	3,090	2,308	33.9
8	75	Norsk Data AS	3,618	2,799	29.3
9	56	Cray Research Inc.	3,999	3,180	25.8
10	48	Telex Corp.	7,848	6,370	23.2

■ Apple is 10% bigger than it was in the boom year of 1984 and Cray just keeps on growing.

FIGURE 14 Shrinking Populations

RANKED BY PERCENT REDUCTION IN STAFF

	DTM 100 RANK	COMPANY	1986 EMPLS.	1985 EMPLS.	% DECREASE
1	11	Control Data Corp.	34,200	44,300	22.8
2	95	Perkin-Elmer Corp.	3,000	3,749	20.0
3	49	Nat'l Semiconductor	30,800	37,100	17.0
4	64	Harris Corp.	26,700	31,400	15.0
5	74	Tektronix Inc.	17,350	20,094	13.7
6	86	Gould Inc.	10,613	12,012	11.6
7	83	Convergent Tech.	2,483	2,759	10.0
8	16	AT&T	311,000	337,600	7.9
9	28	Data General Corp.	15,565	16,535	5.7
10	98	Eastman Kodak	121,450	128,950	5.8

■ AT&T and Convergent are connected by more than coincidence: some of Convergent's shrinkage was due to falling orders from AT&T.

sharing, and remote processing; maintenance and repair; computer leasing; point-of-sale systems; and automatic teller machines.

Explicitly excluded are the following: data transmission or "basic" services from specialized common carriers that are not integrated with a data processing service; standalone electronic or mag card typewriters; standalone electronic cash registers; instrumentation; semiconductors; printed circuit boards; automatic test equipment; dp supplies, with the exception of magnetic media for disk and tape drives; industrial control devices; central office telephone switches; analog PBXs; and computer-output micrographic systems.

Figures listed in the DATAMATION 100 for mainframes and minis represent only the sale of the processor itself; figures for peripherals and software sold as part of a system are grouped into the peripherals and software categories.

Whenever possible, information in the DATAMATION 100 is obtained from the companies themselves. When a company does not provide information, or does not provide it in a form suitable for this survey, we have estimated the figures based on investigative reporting and analysis of industry trends. The net income reported for each company represents total earnings, not just earnings from dp revenues. Revenues derived from sales to other divisions or units within a company are considered captive sales and are not included in this survey.

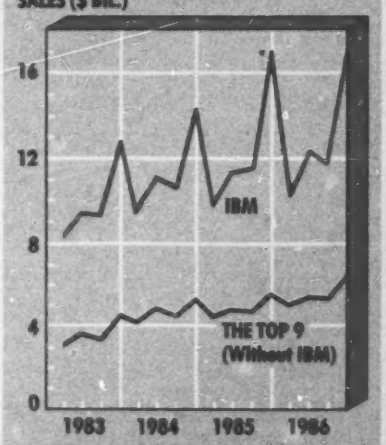
Results for non-U.S. companies are converted into U.S. dollars using OECD average exchange rates. For 1986, equivalents to one dollar in these currencies were the following: Canada, C$1.39; Finland, Fmk5.07; France, FF6.93; Italy, L1,491.1; Japan, ¥168.52; the Netherlands, G2.45; Norway, NOK7.39; Sweden, SKr7.12; the U.K., £.68; West Germany, DM2.17; South Korea, W879.51.

For 1985, equivalents to one dollar in these currencies were the following: Canada, C$1.37; Finland, Fmk6.20; France, FF8.98; Italy, L1,909.4; Japan, ¥238.62; the Netherlands, G3.32; Norway, NOK8.59; Sweden, SKr8.6; the U.K., £.78; West Germany, DM2.94; South Korea, W869.57. ■

More than any other feature published during the year, the DATAMATION 100 is a joint effort by the entire DATAMATION staff. Almost everyone on the staff writes profiles of one or more of the companies. Research is conducted in DATAMATION's bureaus across the U.S., in London, and in Tokyo, with further contributions by DATAMATION stringers thoughout Europe and in Asia. In New York, managing editor Parker Hodges and contributing editor Joseph Kelly beseeched and badgered more than 200 companies, building the most reliable database in existence on the leaders of the dp industry around the world. Finally, everyone on the staff is involved in editing and producing the 50 pages of this issue that are devoted to the DATAMATION 100.

FIGURE 15 Quarterly Report

How 10 leading U.S. companies that sell predominantly computers have performed over the 16 quarters of 1983-86. The combined quarterly results of DEC, NCR, Wang, Apple, Data General, Prime, Commodore, Tandem, and Amdahl are shown in red; IBM's are shown in blue.



■ Is the computer industry out of the doldrums? Tracing the combined quarterly revenue results of nine leading U.S. computer companies suggests the slump may indeed be ending. But at IBM, 1986's fourth-quarter doesn't look much higher than 1985's.

The Datamation 100 - The Leading Worldwide Dp Companies

1986 RANK	1985 RANK	COMPANY	1986 DP REVENUE	1985 DP REVENUE	DP REV % CHG	1986 TOTAL REVENUE	DP AS % OF TOT
1	1	IBM	$49,591.0	$48,554.0	2.1	$51,250.0	96.7
2	—	Unisys Corp.	9,431.0	NA	NA	9,536.7	98.8
3	2	Digital Equipment Corp.	8,414.3	7,029.4	19.7	8,414.3	100.0
4	5	Fujitsu Ltd.	6,575.7	4,309.4	52.6	10,384.5	63.3
5	7	NEC Corp.	6,324.6	3,761.7	68.1	15,034.8	42.0
6	11	Hitachi Ltd.	4,728.8	2,885.3	63.9	28,984.4	16.3
7	9	Hewlett-Packard Co.	4,500.0	4,018.0	12.0	7,102.0	63.3
8	10	Siemens AG	4,387.1	2,928.3	49.8	21,669.6	20.2
9	6	NCR Corp.	4,377.6	3,885.5	12.7	4,881.6	89.6
10	12	Ing. C. Olivetti & Co. S.p.A.	3,865.2	2,518.2	53.5	4,902.3	78.8
11	8	Control Data Corp.	3,346.7	3,679.7	-9.1	3,346.7	100.0
12	13	Wang Laboratories Inc.	2,668.9	2,428.3	9.9	2,668.9	100.0
13	21	Toshiba Corp.	2,605.0	1,608.6	61.9	20,135.5	12.9
14	16	Groupe Bull	2,568.0	1,794.5	43.1	2,568.0	100.0
15	14	Xerox Corp.	2,100.0	1,959.0	7.2	12,919.0	16.2
16	18	AT&T Co.	2,085.0	1,990.0	4.8	34,087.0	6.1
17	23	Nixdorf Computer AG	2,075.1	1,339.9	54.9	2,075.1	100.0
18	17	Apple Computer Inc.	2,031.0	1,753.8	15.8	2,031.0	100.0
19	20	Matsushita Electric Indust. Co.	1,944.0	1,447.6	34.3	29,615.4	6.5
20	15	Honeywell Inc.	1,890.0	1,951.9	-3.2	7,268.2	26.0
21	22	N.V. Philips Gloeilampenfabrieken	1,763.3	1,365.6	29.1	22,464.1	7.8
22	24	STC plc	1,748.7	1,330.8	31.4	2,794.1	62.5
23	19	TRW Inc.	1,625.0	1,450.0	12.1	6,035.9	26.9
24	27	Tandy Corp.	1,560.2	1,200.0	30.0	3,322.8	46.9
25	33	Mitsubishi Electric Corp.	1,345.0	933.3	44.1	12,250.7	10.9
26	26	LM Ericsson	1,344.2	1,228.2	9.4	4,444.4	30.2
27	31	Automatic Data Processing Inc.	1,298.1	1,102.1	17.8	1,298.1	100.0
28	28	Data General Corp.	1,287.6	1,198.9	7.4	1,287.6	100.0
29	30	McDonnell Douglas Corp.	1,189.8	1,104.5	7.7	12,661.0	9.4
30	39	Nippon Telegraph & Telephone	1,160.5	764.1	51.9	31,265.4	3.7
31	32	General Motors Corp.	1,125.9	978.3	15.1	102,813.7	1.1
32	—	Seiko Epson Corp.	1,035.7	541.8	91.2	1,839.5	56.3
33	53	Compagnie Générale d'Electricité	1,025.0	735.2	39.4	11,673.9	8.7
34	50	Nippon Univac Kaisha Ltd.	985.9	633.8	55.6	985.9	100.0
35	37	Computer Sciences Corp.	977.7	800.7	22.1	977.7	100.0
36	35	Amdahl Corp.	966.6	862.0	12.1	966.6	100.0
37	47	Ricoh Company Ltd.	933.8	634.7	47.1	3,506.8	26.6
38	25	Northern Telecom Ltd.	900.0	900.0	0	4,384.0	20.5
38	29	General Electric Co.	900.0	1,130.0	-20.4	36,725.0	2.4
40	54	Comdisco Inc.	886.7	650.5	36.3	901.6	98.3
41	40	ITT Corp.	880.0	756.0	16.4	17,437.0	5.0
42	34	Oki Electric Industry Co. Ltd.	879.6	890.4	-1.2	2,229.1	39.4
43	38	Prime Computer Inc.	860.2	769.7	11.8	860.2	100.0
44	48	Tandem Computers Inc.	835.8	634.6	31.7	835.8	100.0
45	43	C. Itoh & Co. Ltd.	808.7	706.0	14.6	88,119.3	0.9
46	41	Commodore International Ltd.	800.0	750.0	6.7	837.7	95.5
47	42	Texas Instruments Inc.	750.0	750.0	0	4,974.0	15.0
48	49	Telex Corp.	728.2	597.4	21.9	817.0	89.1
49	46	National Semiconductor Corp.	725.0	650.0	11.5	1,678.0	43.2
50	95	Seagate Technology	709.4	303.6	133.7	709.4	100.0

All currency figures are in millions. NA = not available.

NONDOLLAR ACCTG CURRENCY					R&D			
1986 DP	1985 DP	% CHG	COUNTRY	1986 EMPLS	CORP 1986	AS % OF TOT REV	NET INCOME	FISCAL YEAR END
				403,508	$5,221.0	10.2	$4,789.0	Dec.
				98,300	992.0	10.4	254.3	Dec.
				101,000	898.3	10.7	861.5	June
¥1,108,134.0	¥1,026,050.0	8.0	Japan	84,277	910.4	8.8	155.7	March
¥1,065,820.0	¥895,647.0	19.0	Japan	95,796	1,431.6	9.5	200.5	March
¥796,899.0	¥686,985.0	16.0	Japan	164,117	1,754.8	6.1	739.1	March
				82,000	824.0	11.6	516.0	Oct.
DM9,520.0	DM8,610.0	10.5	W.Ger.	363,000	2,488.5	11.5	679.3	Sept.
				62,000	320.7	6.6	336.5	Dec.
L5,769,000.0	L5,036,500.0	14.5	Italy	59,091	262.1	5.4	378.9	Dec.
				34,200	403.2	12.1	-264.5	Dec.
				31,000	190.7	7.2	-86.4	June
¥439,000.0	¥383,000.0	14.6	Japan	124,000	1,246.1	6.2	230.6	March
FF17,796.0	FF16,109.0	10.4	France	26,804	265.8	10.4	39.1	Dec.
				100,367	650.0	5.0	465.0	Dec.
				311,000	2,278.0	6.7	139.0	Dec.
DM4,503.0	DM3,939.6	14.3	W.Ger.	25,576	196.8	9.5	102.3	Dec.
				5,940	150.6	7.4	155.3	June
¥327,600.0	¥344,662.7	-4.9	Japan	135,881	1,484.1	5.0	1,003.4	Nov.
				98,597	473.7	6.5	9.6	Dec.
G4,320.0	G4,534.0	-4.7	Neth.	344,200	1,706.9	7.6	414.3	Dec.
£1,189.1	£1,038.0	14.5	U.K.	NA	NA	NA	151.6	Dec.
				78,644	1,627.5	27.0	217.7	Dec.
				36,000	NA	NA	216.4	June
¥226,654.0	¥222,210.0	2.0	Japan	71,479	528.7	4.3	113.6	March
SKr9,571.0	SKr10,561.0	-9.3	Sweden	75,000	400.0	9.0	53.1	Dec.
				20,000	45.8	3.5	115.5	June
				15,565	143.1	11.1	-26.8	Sept.
				105,000	504.8	4.0	277.5	Dec.
¥195,569.0	¥181,925.0	7.5	Japan	300,000	949.4	3.0	928.2	March
				876,000	4,157.0	4.0	2,944.7	Dec.
¥174,530.0	¥129.000.0	35.2	Japan	12,000	165.6	9.0	NA	March
FF7,103.0	FF6,600.0	7.6	France	150,000	NA	NA	248.2	Dec.
¥166,138.0	¥150,902.0	10.1	Japan	4,121	43.1	4.4	16.6	March
				17,300	NA	NA	30.3	March
				7,150	119.0	12.3	41.8	Dec.
¥157,357.0	¥151,118.0	4.1	Japan	NA	195.8	5.6	67.4	March
				46,202	474.5	10.8	286.6	Dec.
				359,000	3,300.0	9.0	2,492.0	Dec.
				930	NA	NA	79.0	Sept.
				123,000	542.0	3.1	527.9	Dec.
¥148,224.0	¥211,995.0	-30.0	Japan	18,686	145.7	6.5	-14.8	March
				8,621	92.0	10.7	46.9	Dec.
				5,700	91.1	10.9	79.2	Sept.
¥136,288.0	¥168,091.0	-18.9	Japan	10,100	NA	NA	109.7	March
				NA	NA	NA	-10.0	June
				77,270	804.0	16.2	101.9	Dec.
				7,848	43.0	5.3	72.8	March
				30,800	222.4	13.3	-83.6	May
				11,872	18.9	2.7	90.4	June

The Datamation 100 - The Leading Worldwide Dp Companies

1986 RANK	1985 RANK	COMPANY	1986 DP REVENUE	1985 DP REVENUE	DP REV % CHG	1986 TOTAL REVENUE	DP AS % OF TOT
51	45	Storage Technology Corp.	$696.0	$673.4	3.4	$696.0	100.0
52	44	Motorola Inc.	694.0	704.0	-1.4	5,888.0	11.7
53	58	Martin Marietta Corp.	659.4	564.4	16.8	4,752.5	13.8
54	52	Compaq Computer Corp.	625.2	503.9	24.1	625.2	100.0
55	51	Intergraph Corp.	605.7	526.4	15.1	605.7	100.0
56	62	Cray Research Inc.	596.7	380.2	56.9	596.7	100.0
57	—	Lockheed Corp.	551.0	113.3	386.3	10,300.0	5.3
58	67	Zenith Electronics Corp.	548.0	352.0	55.7	1,892.0	28.9
59	68	Arthur Andersen & Co.	546.0	414.7	31.7	2,009.9	27.1
60	65	BASF	520.7	357.1	45.8	18,650.2	2.7
61	57	Computervision Corp.	494.7	441.1	12.2	494.7	100.0
62	66	Mannesmann Kienzle GmbH	488.9	355.7	37.5	627.6	77.9
63	61	Racal Electronics plc	469.1	380.8	23.2	1,902.9	24.6
64	36	Harris Corp.	464.0	480.1	-3.4	2,089.1	22.2
65	90	Atlantic Computers plc	431.0	224.4	92.1	470.6	91.5
66	87	Cap Gemini Sogeti	419.9	245.1	71.3	419.9	100.0
67	69	Xidex Corp.	418.3	232.8	79.7	533.5	78.4
68	—	Samsung	396.0	NA	NA	NA	NA
69	74	Apollo Computer Inc.	391.7	295.6	32.5	391.7	100.0
70	—	AGS Computers Inc.	381.0	279.0	36.6	381.0	100.0
71	72	Shared Medical Systems Corp.	374.9	312.2	20.1	374.9	100.0
72	77	Ferranti plc	351.5	282.1	24.6	926.3	37.9
73	63	Dataproducts Corp.	350.8	370.6	-5.3	350.8	100.0
74	64	Tektronix Inc.	350.0	366.9	-4.6	1,352.5	25.8
75	92	Norsk Data AS	349.1	219.8	58.8	349.1	100.0
76	—	Sun Microsystems Inc.	341.1	147.1	131.9	341.1	100.0
77	55	British Telecom plc	330.4	198.7	66.3	14,008.7	2.3
78	70	Diebold Inc.	325.5	324.2	0.4	413.6	78.7
79	59	Datapoint Corp.	325.0	404.2	-19.6	325.0	100.0
80	78	Contel Corp.	311.0	277.8	12.0	3,073.9	10.1
81	—	Bell Atlantic Corp.	310.0	252.0	23.0	9,920.8	3.1
82	—	CSK Corp.	308.7	189.5	62.9	308.7	100.0
83	60	Convergent Technologies Inc.	305.8	459.3	-33.4	305.8	100.0
84	79	Boeing Co.	300.0	250.0	20.0	16,341.0	1.8
85	86	Plessey Co. plc	294.1	250.0	17.6	2,173.4	13.5
86	80	Gould Inc.	290.0	269.4	7.7	908.8	31.9
87	84	MAI Basic Four Inc.	287.9	249.4	15.4	287.9	100.0
88	91	Sony Corp.	285.2	221.8	28.6	7,863.5	3.6
89	89	Lotus Development Corp.	283.0	225.5	25.5	283.0	100.0
90	—	Continental Information Systems	278.0	NA	NA	283.0	98.2
91	93	Nokia Corp.	273.4	217.6	25.6	2,365.7	11.5
92	—	United leasing	267.6	NA	NA	326.5	81.9
93	—	Computer Associates Int'l Inc.	264.9	170.4	55.5	264.9	100.0
94	—	Nomura Computer Systems Co. Ltd.	263.5	151.7	73.7	263.5	100.0
95	85	Paradyne Corp.	261.1	252.5	3.4	261.1	100.0
96	—	Microsoft Corp.	260.2	162.6	60.0	260.2	100.0
97	75	3M	255.0	295.4	-13.7	8,600.0	2.9
98	97	Eastman Kodak	250.0	210.0	19.1	11,550.0	2.1
99	—	Emhart Corp.	248.5	203.0	22.4	2,094.3	11.8
100	—	Recognition Equipment Inc.	246.6	163.1	51.2	246.6	100.0

All currency figures are in millions. NA = not available.

NONDOLLAR ACCTG CURRENCY					R&D			
1986 DP	1985 DP	% CHG	COUNTRY	1986 EMPL	CORP 1986	AS % OF TOT REV	NET INCOME	FISCAL YEAR END
				8,400	$68.5	9.8	$36.2	Dec.
				94,400	492.0	8.4	194.0	Dec.
				65,800	218.9	4.6	202.3	Dec.
				1,900	26.5	4.2	42.8	Dec.
				5,650	57.7	9.5	70.4	Dec.
				3,999	87.7	14.7	124.8	Dec.
				96,900	NA	NA	408.0	Dec.
				33,000	96.0	5.1	-10.0	Dec.
				36,117	NA	NA	NA	Aug.
DM1,130.0	DM1,050.0	7.6	W.Ger.	131,468	NA	NA	NA	Dec.
				4,770	52.7	10.7	-5.8	Dec.
DM1,061.0	DM1,046.0	1.4	W.Ger.	8,864	NA	NA	NA	Dec.
£319.0	£297.0	7.4	U.K.	32,000	142.6	7.5	135.3	March
				26,700	118.0	5.7	68.6	June
£293.1	£175.0	67.4	U.K.	630	2.5	0.5	29.9	Dec.
FF2,910.0	FF2,200.0	32.2	France	7,500	20.9	5.0	27.4	Dec.
				6,500	10.9	2.0	32.5	June
W348,300.0	NA	NA	S.Korea	NA	NA	NA	NA	Dec.
				3,600	44.6	11.4	9.3	Jan.
				3,090	5.0	1.3	8.8	Dec.
				3,700	34.4	9.2	32.0	Dec.
£239.0	£220.0	8.6	U.K.	NA	NA	NA	NA	March
				4,200	65.0	18.5	12.8	March
				17,350	195.3	14.4	55.2	May
NOK2,580.0	NOK1,888.0	36.6	Norway	3,618	31.4	9.0	63.3	Dec.
				3,350	43.8	12.8	24.5	June
£224.7	£155.0	44.9	U.K.	236,000	236.8	1.7	NA	March
				5,320	16.4	4.0	34.9	Dec.
				3,621	30.0	9.2	-1.8	July
				23,098	NA	NA	232.9	Dec.
				80,185	NA	NA	1,167.1	Dec.
¥52,016.0	¥45,128.0	15.2	Japan	4,652	11.4	3.7	19.4	Sept.
				2,483	32.8	10.7	-32.8	Dec.
				115,000	757.0	4.6	665.0	Dec.
£200.0	£195.0	2.5	U.K.	NA	NA	NA	169.6	March
				10,613	104.6	11.5	-101.8	Dec.
				2,924	14.5	5.0	10.4	Sept.
¥48,054.0	¥52,806.6	-9.0	Japan	46,947	720.4	9.2	248.6	Oct.
				1,400	32.5	11.5	48.3	Dec.
				379	NA	NA	13.8	Feb.
Fmk1,386.0	Fmk1,349.0	2.7	Finland	30,000	118.3	5.0	132.9	Dec.
£182.0	NA	NA		NA	NA	NA	NA	March
				2,400	34.7	13.1	30.5	March
¥44,405.0	¥36,112.0	22.9	Japan	1,044	NA	NA	NA	Sept.
				3,000	19.4	7.4	-38.5	Dec.
				1,500	28.2	10.8	57.6	June
				82,000	564.0	6.6	779.4	Dec.
				121,450	1,059.0	9.2	374.0	Dec.
				34,173	43.9	2.1	-10.2	June
				2,907	11.6	4.7	11.3	Oct.

The
Datamation 100

The U.S. 100 - The Leading U.S. Dp Companies

1986 RANK	COMPANY	1986 DP REVENUE
1	IBM	$49,591.0
2	Unisys Corp.	9,431.0
3	Digital Equipment Corp.	8,414.3
4	Hewlett-Packard Co.	4,500.0
5	NCR Corp.	4,377.6
6	Control Data Corp.	3,346.7
7	Wang Laboratories Inc.	2,668.9
8	Xerox Corp.	2,100.0
9	AT&T Co.	2,085.0
10	Apple Computer Inc.	2,031.0
11	Honeywell Inc.	1,890.0
12	TRW Inc.	1,625.0
13	Tandy Corp.	1,560.2
14	Automatic Data Processing Inc.	1,298.1
15	Data General Corp.	1,287.6
16	McDonnell Douglas Corp.	1,189.8
17	General Motors Corp.	1,125.9
18	Computer Sciences Corp.	977.7
19	Amdahl Corp.	966.6
20	General Electric Co.	900.0
21	Comdisco Inc.	886.7
22	ITT Corp.	880.0
23	Prime Computer Inc.	860.2
24	Tandem Computers Inc.	835.8
25	Commodore International Ltd.	800.0
26	Texas Instruments Inc.	750.0
27	Telex Corp.	728.2
28	National Semiconductor Corp.	725.0
29	Seagate Technology	709.4
30	Storage Technology Corp.	696.0
31	Motorola Inc.	694.0
32	Martin Marietta Corp.	659.4
33	Compaq Computer Corp.	625.2
34	Intergraph Corp.	605.7
35	Cray Research Inc.	596.7
36	Lockheed Corp.	551.0
37	Zenith Electronics Corp.	548.0
38	Arthur Andersen & Co.	546.0
39	Computervision Corp.	494.7
40	Harris Corp.	464.0
41	Xidex Corp.	418.3
42	Apollo Computer Inc.	391.7
43	AGS Computers Inc.	381.0
44	Shared Medical Systems Corp.	374.9
45	Dataproducts Corp.	350.8
46	Tektronix Inc.	350.0
47	Sun Microsystems Inc.	341.1
48	Diebold Inc.	325.5
49	Datapoint Corp.	325.0
50	Contel Corp.	311.0
51	Bell Atlantic Corp.	$310.0
52	Convergent Technologies Inc.	305.8
53	Boeing Co.	300.0
54	Gould Inc.	290.0
55	MAI Basic Four Inc.	287.9
56	Lotus Development Corp.	283.0
57	Continental Information Systems	278.0
58	Computer Associates Int'l Inc.	264.9
59	Paradyne Corp.	261.1
60	Microsoft Corp.	260.2
61	3M	255.0
62	Eastman Kodak Co.	250.0
63	Emhart Corp.	248.5
64	Recognition Equipment Inc.	246.6
65	Tandon Corp.	242.8
66	Wyse Technology	228.0
67	Concurrent Computer Corp.	227.7
68	Gerber Scientific Inc.	213.1
69	Dun & Bradstreet Corp.	210.0
70	Sterling Software Inc.	209.6
71	Reynolds & Reynolds Co.	204.3
72	Ashton-Tate	203.2
73	Atari	200.0
73	Intel Corp.	200.0
75	Decision Data Computer Corp.	195.1
76	Management Science America Inc.	193.5
77	Micom Systems Inc.	191.6
78	General DataComm Industries Inc.	189.2
79	Miniscribe Corp.	184.9
80	Software AG Systems Inc.	180.0
81	Centronics Data Computer Corp.	175.0
82	Mentor Graphics Corp.	173.5
83	General Instrument Corp.	171.0
84	Cullinet Software Inc.	166.9
85	ISC Systems Corp.	162.4
86	Digital Communications Associates Inc.	162.2
87	Ameritech	159.0
88	NBI Inc.	158.3
89	The Ultimate Corp.	157.6
90	HBO & Company	155.0
91	Cipher Data Products Inc.	152.5
92	National Data Corp.	152.0
93	Policy Management Systems Corp.	151.0
94	Maxtor Corp.	148.0
95	Commerce Clearing House Inc.	147.7
96	Intelogic Trace Co.	145.2
97	Intelligent Systems Inc.	143.5
98	Computer Task Group Inc.	143.4
99	Uccel Corp.	141.6
100	American Management Systems Inc.	135.5

All dollar figures are in millions.

1

INTERNATIONAL BUSINESS MACHINES CORP.

Old Orchard Rd.
Armonk, NY 10504
(914) 765-1900

It was the first time since the Great Depression that IBM has had two consecutive years of falling profits. Geared for 15% to 20% growth per year, IBM's tiny 2.4% increase on sales of $51.25 billion was a severe blow. Analysts speculate that IBM now has an excess capacity—in people, plant, equipment, etc.—of more than 30% than is required by current business levels. Bulging inventories hit a record $10 billion-plus in spring '86. It was not surprising that IBM's earnings plunged 27% to $4.79 billion during the year; profits will continue to be squeezed until IBM scales back its operation.

Things would have been worse without the ailing dollar. Revenues from overseas operations increased 20% to $25.89 billion during the year, but would have been down slightly without the huge currency translations. Non-U.S. profits rose just 3.7% to $3.19 billion, providing the first hard evidence that IBM's overcapacity problem has now spread overseas.

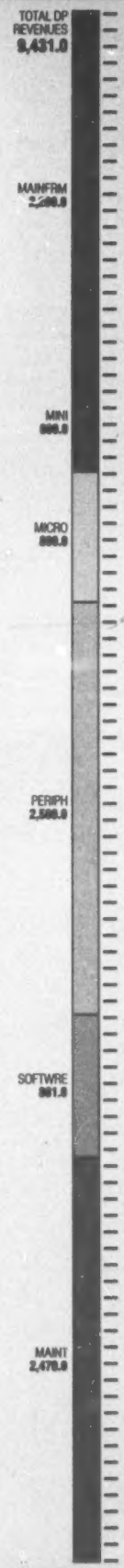
The company's top management continued to blame the domestic economy for its woes, and seemed unwilling to admit that its overhead cost structures and investments of the past few years have been higher than necessary. But IBM's corrective actions spoke of dawning understanding: capital spending for the year was slashed 22% to $4.1 billion and inventories reduced 13% to $9 billion, in part through a major write-off late in the year.

Further downsizing came in the form of staff reductions. The company finished the year with 5,000 fewer U.S. employees and will reduce its domestic work force by 12,000 people this year—mostly through early retirement. Similar steps are expected overseas.

Sales of IBM's flagship Sierra mainframes were up (20% worldwide, say insiders), anchoring the company all year, but demand for its peripherals and PCs was down sharply.

At the heart of IBM's problems were its aging and incompatible midrange products. It was here that IBM focused most of its product announcements, kicking off the first quarter with new, aggressively priced 4381s, following up in the second quarter with a flurry of new System/36 and 38 processors and related products (125 in all!), and climaxing in the fourth quarter with the machine many had been waiting for—a departmental 370, the so-called 9370. The company spent much of the year reducing the number of machine architectures in its midrange: deemphasizing its Series/1 and 8100, and cleverly positioning its incompatible Systems/36 and 38 as a single product line.

Revenue figures are in millions of dollars. Each increment represents $100 million.



2

UNISYS CORP.

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Detroit, MI 48232
(313) 972-7000

As Burroughs chairman W. Michael Blumenthal explained it, "The marketplace for information systems has been a quasi-monopoly; IBM is larger than the next 13 competitors combined, claims 70% of industry profits, and dominates virtually every market segment." The answer, according to Blumenthal, was for Sperry and Burroughs to join forces and gain the credibility and critical mass necessary to fund new product development and compete with IBM. After a month-long courtship, Sperry's board accepted $76.50 per share.

Blumenthal spent most of the rest of 1986 trying to reassure Sperry mainframe customers that he intended to continue to support and enhance the Sperry 1100 computer product line; he also worked at making Unisys' new critical mass a little less massive.

Unisys began with 98,300 employees from the combined companies, about $9.43 billion in dp-related revenue, and a $30 billion worldwide installed base. It also had $4.8 billion in new debt. Unisys quickly brought down that debt and cut operating expenses by selling off its Sperry aerospace division to Honeywell and unloading most of its Memorex peripherals marketing business to a group of its employees.

Unisys also reduced its work force by about 9,600, closing some operations such as its Bristol, Tenn., and Eau Claire, Wis., manufacturing facilities. Unisys predicted it would reduce its work force by some 12,000 by the end of 1987 in an effort to reduce operating expenses by some $275 million a year.

Unisys' efforts to reassure users was surprisingly successful. Although orders for new Sperry equipment dropped off immediately following the merger, Unisys reported they picked up again in the third quarter and improved further in the fourth quarter.

Prior to the merger, Burroughs introduced a midrange entry in its A Series mainframe line, the A 12, and also introduced an entry-level model in its V Series, called the V 310. After the merger, Unisys added a long-planned, medium-scale product line, the CMOS-based 2200/200, compatible with the 1100.

Few observers predict significant mainframe market share inroads against IBM in 1987. Blumenthal, in his year-ending statement, was circumspect: "Because it is difficult to anticipate the duration of the sluggish and uneven computer industry demand, particularly in the United States, and the continued uncertainty as to the levels of defense spending, the company is not planning for any meaningful benefits from industry conditions during the year."

Revenue figures are in millions of dollars. Each increment represents $100 million.

3

DIGITAL EQUIPMENT CORP.

146 Main St.
Maynard, MA 01754
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While it was IBM that made most of the announcements in this past "year of the midrange," it was Digital that made most of the midsector money. It was all a matter of timing. IBM was at the tail end of its current product cycle and could put only aging minis into the field; Digital's cycle, however, was just beginning. Digital's momentum, and its positioning as the company with the right products to serve as the prime contractor for networks, allowed it to gain market share from all its rivals.

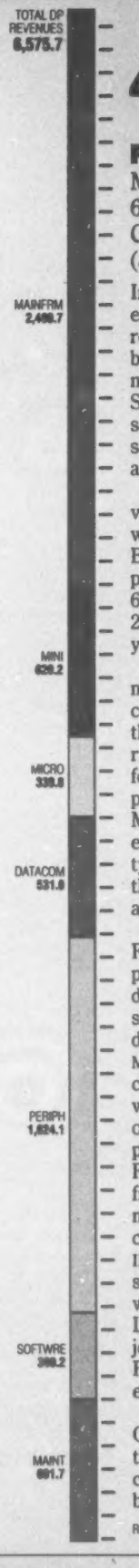
It outgrew the industry by a large margin. Revenues were up almost 20% during the calendar year, to $8.4 billion, but the real eye-opener was the mini maker's net profit: in an ailing industry, its net grew a staggering 115%, to $861.5 million. During the final quarter, the margin hit a record 51.8%, a familiar range for IBM but virgin territory for Digital.

The company bucked every industry trend: hiring was up 11%, bringing its employee total to 101,000; R&D spending rose 16.6%, to $898.3 million; capital expenditures were up; and while others complained of a weakening of overseas demand, that was up too—especially in Europe, which accounted for 33% of all revenue (up from 31% in '85). International revenues accounted for 44% of Digital's 1986 total, up from 40% the year before—although the company is still finding Japan and the Far East a tough nut to crack.

Digital's strategy for the year was to target large decentralized companies in the service sector and in IBM bastions where Digital historically has been weak. Recently, it added health care and food and beverages as targets. Digital claims major successes; for example, it gained 25 new customers in the "true blue" insurance business.

Meanwhile, it extended its nine-year-old VAX design both up and down. The first quarter saw enhancements at the top and bottom of the line (a pattern that has since been repeated, early this year) when Digital announced its biggest computer to date, the 12MIPS 8800 (prices starting at $650,000) and its low-end 8200 and 8300. A second generation midrange machine, the 8500, followed in the second quarter, and then two more upper-end offerings, the commercially oriented 8550 and 8700 for industrial and scientific customers, in the third quarter. All six new VAX models use the VAX Bus Interconnect architecture announced in January 1986. By September 1986, Digital felt confident enough to announce its first personal computer since its failure with Rainbow over two years ago.

Revenue figures are in millions of dollars. Each increment represents $100 million.



4

FUJITSU LTD.

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Chiyoda-ku, Tokyo 100, Japan
(81-3) 211-5236

In 1986, Japan's number one computer maker eked out a small revenue increase: overall sales rose almost 12% to ¥1.75 trillion ($10.4 billion), but profits were off an estimated 49%. Dp revenues were up 8% to ¥1.1 trillion ($6.57 billion). Semiconductors, accounting for 12% of total sales, continued to be the darkest spot on Fujitsu's balance sheet, owing to an industry slump and unfavorable exchange rates.

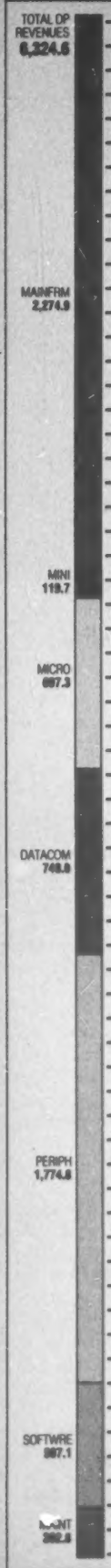
The top-end M-780, introduced in November 1985, boosted both sales and profits, with 79 systems ordered by the end of 1986. But first shipments were delayed by half a year, putting it far behind IBM's 3090 and Hitachi's M-68X. Sales of the older M-380 were flat, with 247 orders received in the first half of the fiscal year (April through September).

New products included the 9450A business workstation, the K-series R model office computers, the low-end VP-30 supercomputer, the FM R series of pcs, and the FETEX-3000 series of large-scale PBXs. The last, consisting of four models with from 1,200 to 16,000 lines capacity, were very successful: 250 shipped in the March-to-July period alone and will be up for export before long. Office computers of all types were up 50% over the previous year, thanks to an increase to 350 dealers from 200, and to 200 application programs from 73.

Operating system vagueness hampered Fujitsu in the mid- and large-sized general purpose category, confusing customers who wondered about the future of the IBM-compatible strategy. In October, the company announced development of a new OS to replace the OSIV/F4 MSP.E20 introduced in 1984. Although Fujitsu claimed the new system was 90% compatible with IBM's MVS/XA and that it had no intention of abandoning its pcm strategy, the company plans to enhance the OS by adding new features. Fujitsu also announced the sale of its first mainframe running Amdahl's UTS Unix in native mode, thereby renewing speculation that the company views the AT&T OS as a way out of its IBM-compatibility dilemma. In May, Siemens stopped offering the Fujitsu OS with the hardware it was marketing under the Siemens name. Later in the year, Siemens formed Comparex, a joint venture with BASF, to sell both Hitachi and Fujitsu hardware—a blow to Fujitsu's image even before sales began.

Construction of a semicustom IC plant in Oregon was started late in the year, an ironic turn after the company's threat in March to close its San Diego memory chip factory after being accused of dumping EPROMs.

Revenue figures are in millions of dollars. Each increment represents $100 million.



5

NEC CORP.

33-1 Shiba 5-chome
Minato-ku, Tokyo 108, Japan
(81-3) 454-1111

NEC was hard hit by the appreciating value of the yen, with overall corporate revenues increasing only an estimated 7.6% to ¥2.5 trillion ($15 billion), and profits off more than 43% in local currency. Data processing sales were up 19% in yen, though, which helped make up for red ink in semiconductors. DATAMATION estimates NEC's dp revenues to be ¥1.1 trillion ($6.3 billion). NEC has responded to the problems of the expensive yen and increasing trade friction with a flurry of overseas activities. Not long after the controversial discounted supercomputer sale to the Houston Area Research Consortium (HARC) that brought accusations of dumping, the company set up a joint venture with Honeywell, called Honeywell-NEC Supercomputer Inc., to sell its SX series in the U.S.

Late in the year came another strategic tie-up, with Honeywell and Bull of France to develop, produce, and market computers. With storms brewing over trade and national security issues in the U.S., NEC took only 15% of the new company, less than expected.

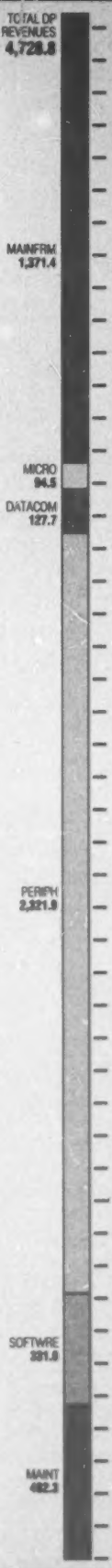
Back home, the company brought out the ACOS 2000 series, with a top four-processor version boasting 170MIPS performance and 512 megabytes of main memory. Covering all bases, in October the company also announced it was introducing a Unix System V-based A-UX operating system as an alternate to ACOS for general purpose mainframes, and that it was expecting a 20% yearly increase in the Japanese Unix market for the next five years. New MS4100 superminis were also introduced.

With overseas production already accounting for 15% of total sales, and having the only integrated semiconductor plant in the U.S. owned by a Japanese firm (in Roseville, Calif.), NEC stepped up overseas manufacturing, beginning production of telecom equipment at its ninth U.S. plant, in Hillsboro, Ore. NEC also said it would expand its Boxborough, Mass., factory to begin making disk drives.

In Asia, digital PBX technology was licensed for manufacture by GoldStar under a seven-year, ¥1 billion ($5.9 million) contract. An opening into the Chinese pc market was initiated in December with an agreement to develop jointly with the Chinese Academy of Sciences a Chinese language keyboard and software for NEC's 16-bit PC-9801 micros.

With about 50% of the Japanese market, NEC is far and away the leader in domestic sales of pcs, but it has done poorly overseas. To overcome that problem last year, it emulated Toshiba by bringing out its own PC-compatible laptop, the MultiSpeed.

Revenue figures are in millions of dollars. Each increment represents $100 million.



6

HITACHI LTD.

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Chiyoda-ku, Tokyo 101, Japan
(81-3) 258-1111

With an export ratio of 30%, and 10% of total domestic production going to the U.S., Hitachi suffered from the increased value of the yen: sales were down about 3% and profits off an estimated 25%. Yet, dp sales of ¥796.9 billion ($4.73 billion) were up 16%, due largely to strong demand for the top-end M-680H and M-682H mainframes. The Sierra competitors were introduced in September 1985 and first shipped in spring '86. By year-end, 186 orders for the M-68X had been received.

Computer exports were up spectacularly. In the April-to-September period they registered a 41% increase over the previous year, and production of cpus for export, mostly of the M-680H, increased late in the year to 40 units per month from 30. The weak market kept down sales of midrange machines, but workstations came on strong, as Hitachi boasted 30,000 orders for the 2020 and 2050 workstations between September 1985 and the end of 1986.

The company aggressively dogged IBM's footsteps, introducing three new M68X models. The high-end, three- and four-processor M-683H and M-684H were announced in May for first shipment this spring, and the M-680D, the entry-level machine in the series, was shipped in December. Two smaller mainframes, the M-660H and M-660K were brought out as replacements for the M-260 series.

Overseas deals also bode well. In February the company announced it had sold 15 large-scale computers to the Bank of China, the first of them delivered in the fall. In May, it sold China a complete on-line banking system consisting of two M-240Ds connected to 160 Chinese language terminals in 40 offices of the Industry and Commerce Bank of China.

Strategic agreements occurred in Asia and Europe. A joint venture, GoldStar-Hitachi Systems Co., was established to provide systems and software support in South Korea, and GoldStar was licensed to manufacture and sell the M-240 and M-260 midrange machines in that country. In November, Siemens of West Germany, previously an exclusive Fujitsu oem, created a joint venture with BASF, called Comparex, to market Hitachi and Fujitsu mainframe hardware running Siemens' BS2000 OS.

The bright dp picture contrasted sharply with the overall outlook: capital equipment spending slashed, executive salaries temporarily cut, and 500 workers transferred from semiconductors to software development. Though increased computer sales nearly offset the drop in semiconductors, VCR exports to the U.S. and color tv sales to China sagged badly.

Revenue figures are in millions of dollars. Each increment represents $100 million.

7

HEWLETT-PACKARD CO.

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Palo Alto, CA 94304
(415) 857-1501

Despite modest gains in revenue and income during 1986, a black cloud remains over Hewlett-Packard. After five years and hundreds of millions of development dollars, HP, in February 1986, finally unveiled Spectrum, its new RISC-based "Precision Architecture," which will serve as the foundation for minicomputer, engineering workstation, and manufacturing systems. But the bubble burst in September when HP announced that shipment of the first Spectrum version of the HP 3000 minicomputer would be delayed by operating system problems until mid-1987.

Since the 3000 line generates almost one third of HP's revenues, the delay of the much needed, much publicized, higher-powered mini was cause for alarm. HP was able to satisfy some of its customers who were running out of power by introducing the current top-of-the-line Series 70 (based on conventional HP 3000 architecture), but its plans to woo new customers were undoubtedly set back.

On the brighter side, in November the company shipped the HP 9000 Model 840, a Unix-based version of Spectrum targeted at engineering and manufacturing applications. With the 840 out the door, HP showed that its basic RISC architecture could be up to snuff.

Following 1985's decline in profits, HP made cost-cutting a top priority, second only to work on Spectrum. Among the measures were pay cuts, hiring freezes, and an early retirement plan. By year's end, worldwide employment was cut by 2,000, now holding at 82,000.

Net revenues for fiscal 1986, ended Oct. 31, were up 9% to $7.1 billion, while net earnings rose 5% to $516 million, or $2.02 a share. HP's dp revenues in calendar 1986 were $4.5 billion, an increase of 12% over 1985. DATAMATION estimates that HP's mini sales increased less than 5%, while peripherals and maintenance services revenues were way up.

Orders grew 13% for the year, a welcome change from 1985's measly 1% gain. But U.S. orders edged up only 4%, because of "a difficult business environment," said company execs. International orders rose 23%, a large portion of that a result of the falling dollar.

Partially in an effort to manage Spectrum, HP reorganized several times during the year. The most significant change took place on July 1 when HP split its Information Systems and Network Sector into two groups, Systems Technology, responsible for internal technology development, and Business Systems and Personal Computation Sector, concerned with mini, pc, and networking products.

Revenue figures are in millions of dollars. Each increment represents $100 million.

8

SIEMENS AG

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D-8000 Munchen 2, West Germany
(49-89) 2340

While Siemens' overall corporate revenues dropped 14% to DM47 billion ($21.7 billion) last year, due mainly to poor export sales and falling nuclear power plant orders, the company's dp division managed a healthy increase when measured in actual accounting currency. In dollars, the increase was even more impressive. Siemens' Communication and Information Systems Group showed a 10% gain in revenues to DM8.7 billion ($4 billion) last year. These revenues, when combined with sales of dp equipment and services through Siemens' other divisions, pushed the company's worldwide dp revenues up by 11% to DM9.5 billion ($4.39 billion).

Siemens controls 25% of West Germany's computer market and 8% of the European market. The company made a concerted effort to expand its European business last summer when it opened its first dp marketing division in the U.K. and announced plans to make the company "the fourth largest computer group within three to four years" in Britain. That is an ambitious plan considering Siemens is starting from scratch in the tough British market.

In its home market of West Germany, Siemens' dp sales to banks were particularly strong, topping DM500 million ($230.4 million) for the first time.

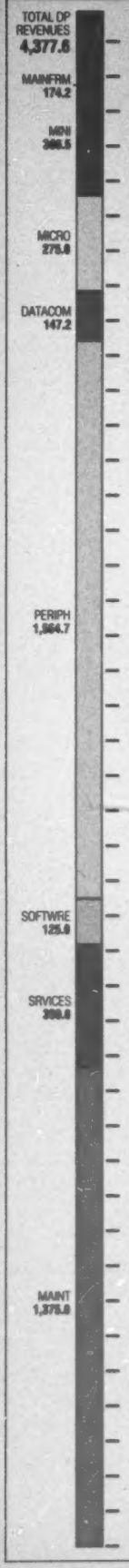
Breaking down Siemens' total dp revenues, the 11 models of its 7.500 mainframe series and its telecom switches were the biggest money-makers. The 7.500 mainframes, ranging from 1MIPS to 27MIPS, produced revenues of DM1.3 billion ($583 million) last year; the digital communications business, including PBX sales, brought in DM2.4 billion ($1.1 billion).

While continuing to take its biggest 7.500 mainframe models from Fujitsu, the company set up a new 50-50 joint venture with BASF in November, called Comparex, to handle its IBM-compatible mainframe business.

The Fujitsu machines sold by Siemens with its own BS2000 operating system are not included in the Comparex deal and continue to account for less than 10% of Siemens' total computer business. The company claims 3,500 installations of the BS2000 operating system on computers ranging up from the PC 2000. This desktop mainframe also hosts Sinix, Siemens' Unix derivative. By the end of 1986, Siemens had installed 13,500 systems with an average of three terminals each, making it one of Europe's leading Unix suppliers.

On the IBM PC-compatible front, Siemens extended its range with the PCD-2 running MS/DOS, which it launched in October.

Revenue figures are in millions of dollars. Each increment represents $100 million.



9

NCR CORP.

1700 S. Patterson Blvd.
Dayton, OH 45479
(513) 445-5000

NCR Corp., referred to by one Wall Street analyst as a "cash machine" because of its low debt and its astute asset management, ended 1986 with its fifth straight quarter of more than double-digit revenue growth. Sales for the year rose 13%, to a record $4.88 billion, with overseas business accounting for almost half of that total. DATAMATION estimates that sales of NCR's dp products grew 13%, to $4.38 billion. Net earnings, squeezed by depressed orders for general purpose computers and cutthroat pricing in NCR's domestic pc business, inched up 7%, to a record $336.5 million.

NCR has weathered the industry storm better than most computer makers because it is less dependent on sales in such depressed industries as oil and heavy manufacturing. Mainframes and communications processors account for less than 9% of total sales. The downside is that these same mainframe customers have become increasingly alienated from the company because of its focus on ATM and financial terminals, pcs, and Unix-based systems. Customers have defected to IBM, Tandem, and others, claiming that NCR is neglecting the high end of its business.

Sensing that something out of the ordinary was required, NCR responded in April with its ambitious seven-model 9800 family of transaction processing systems. This was a radical departure from the batch-style 8000 series that customers currently use, although the two series are object code compatible.

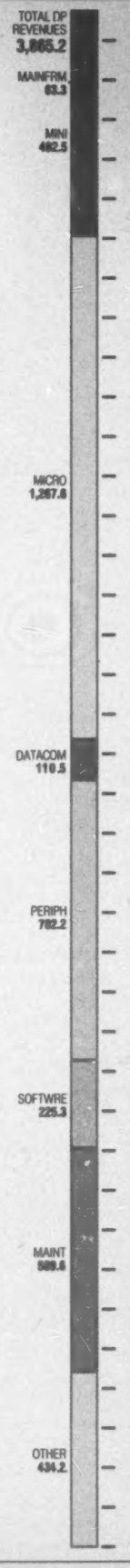
NCR was careful not to forget its new Unix constituency: a new 32-bit entry-level member of its Tower family, the 32/400, was announced and prices were cut across the whole Unix-based family.

In July, the company announced that it was regrouping to mount a concerted attack on the office automation marketplace. Two new divisions—the Computer Systems Division and the Business Systems Division—were formed as part of the restructuring.

Personal computer operations have been bathed in red ink because of aggressive price-cutting by IBM. Though NCR has been achieving its volume objectives, it has not been able to improve its margins. NCR builds its pcs in Augsburg, West Germany, and the declining dollar has put even more pressure on the company's costs.

Though overseas business has been strong—this time aided by a weak dollar—the company revealed that the demand has mostly been for terminals and financial and retail systems, not general purpose computers or pcs.

Revenue figures are in millions of dollars. Each increment represents $100 million.



10

ING. C. OLIVETTI & CO. S.P.A.

Via G. Jervis, 77
10015 Ivrea, Italy
(39-125) 525

Once again, company acquisitions and alliances were big news at Olivetti in 1986: the company bought Triumph-Adler and Bunker Ramo; and EDS and Toshiba signed on for joint projects. After dramatic growth between 1984 and 1985, Olivetti's revenue growth in 1986 was less spectacular but still healthy. Dp sales grew 15% in local currency to L5.8 trillion ($3.9 billion). Net profit was up 13% to L565.5 billion ($378.9 million).

Personal computers continued to be Olivetti's key product. The company surpassed IBM to lead the Italian market with a 37.5% share and held the number two slot in Europe behind IBM with a 12.2% market share. About 500,000 of its pcs were sold worldwide in 1986, of which 40% went to AT&T. Not surprisingly, the U.S. is Olivetti's largest export market.

Olivetti continued to market AT&T's Unix-based 3B minicomputers along with its own Lineo Uno systems. It also added the fault tolerant CPS2000 to the mini line it markets for Stratus, in which it has a 9% equity investment. Through 1986 and early 1987, Olivetti further reinforced its mini involvement by acquiring 51% of Horsham, Pa.-based Decision Industries' European operation. Olivetti sells and services IBM System/3X-compatible minis.

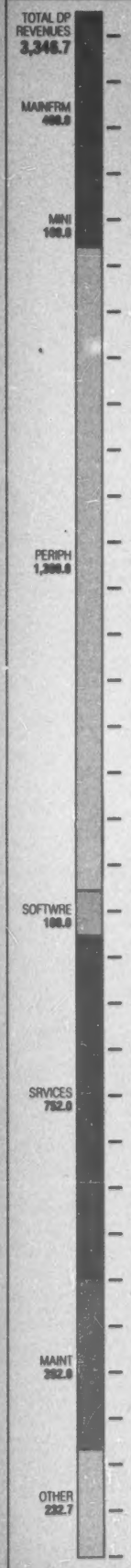
Mainframe sales grew substantially in 1986 to L94.5 billion ($63.3 million) from L80 billion ($40 million) in 1985.

In the flurry of acquisitions and joint ventures last year, several stand out. When Olivetti acquired Volkswagen AG's Triumph-Adler, it automatically increased sales by 18%. In exchange, Volkswagen got 5% of Olivetti's common shares, worth about $260 million (L400 billion). In the U.S., to develop its share of the banking automation market, Olivetti acquired Bunker Ramo Banking Operations, Trumbull, Conn., from ADP.

AT&T continued to be Olivetti's leading partner, both in numbers of computers exported to the U.S. and in opportunities for Olivetti to market AT&T minicomputers and, more recently, PBX products in Europe. Late in 1986, the two companies renewed their alliance, and the agreement limiting AT&T to a 25% share in Olivetti until 1988 was extended to 1990.

The company strengthened its distribution network by investing 89.5% in the startup of MicroAge Europe. Olivetti already had a 46% holding in computer retail chain MicroAge Inc. of Tempe, Ariz. At the other end of the marketing spectrum, Olivetti formed a Large Accounts Division and set up a sales group dedicated to multinational customers.

Revenue figures are in millions of dollars. Each increment represents $100 million.



11

CONTROL DATA CORP.

8100 34th Ave. S.
Bloomington, MN 55420
(612) 853-8100

The year 1986 was one of massive divestment, restructuring, and management realignment for ailing Control Data Corp., which struggled to end the heavy losses that have plagued it since 1984. In 1986, CDC had a net loss of $264.5 million, compared with a net loss of $567.5 million the previous year. Losses in the computer business in 1986 amounted to $307.1 million, compared with $562.7 in 1985.

CDC shed 13 businesses in 1986, including such units as Healthcare Services Inc., the windmill-based Earth Energy Systems Inc., and Plato/Wicat Systems Co., which supplied educational computer systems to schools. Many of these ventures were born during the reign of William Norris, the company's founder and former chairman, who retired amid the 1985 financial crises. Chairman and chief executive officer Robert M. Price was Norris's handpicked successor.

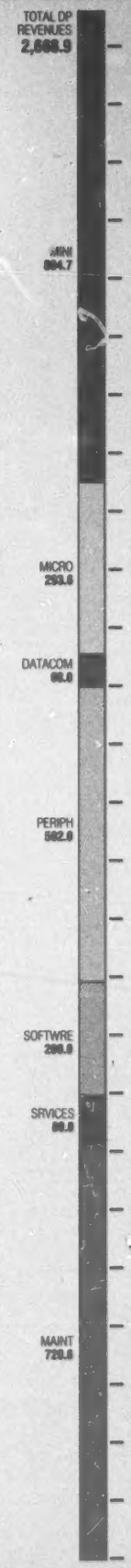
CDC also sold 80% of its stake in Commercial Credit Corp., netting $523.9 million of much-needed cash. A plan to sell Ticketron, CDC's profitable computerized ticketing business, for $140 million to Allen and Co., a New York investment house, fell through when it was denied regulatory approval. CDC also filed a $350 million public debt offering midyear to repay its short-term U.S. bank debt.

Meanwhile, CDC consolidated its worldwide mainframe operation with the formation of the Computer Systems and Services group. In the midst of restructuring, CDC managed to introduce a few new products, including a plant design database management system, two high-performance 16-bit computers for the U.S. government space program, a new 300MB 5¼-inch disk drive, a disk data storage product for supercomputer users, and, this year, a Cyber 180 series departmental computer.

The company continues to fund ETA Systems, its supercomputer subsidiary, although it is rumored that the unit will be merged back into the parent. ETA has hit a number of snags in the development of its first product, the ETA-10, and the product will have a slower than anticipated clock speed in its first release. The subsidiary shipped one unit in 1986 and at press time had orders for three more. ETA has had no revenues in its three years of existence; CDC has poured between $100 million and $150 million into the venture.

Ceo Price says CDC will return to profitability in 1987. Although it has made a valiant effort to pare down its businesses—jettisoning the unprofitable ones—Control Data's future is still uncertain.

Revenue figures are in millions of dollars. Each increment represents $100 million.



12

WANG LABORATORIES INC.

1 Industrial Ave.
Lowell, MA 01851
(617) 459-5000

The year will be remembered at Wang Laboratories as a time of new managers and missed opportunities. The $21.4 million in first-quarter profits seemed to herald recovery, but those results proved a false spring: Wang slipped back into the red in the third and fourth quarters, finishing 1986 with a loss of $86.4 million. The red ink flowed despite a nearly 10% pickup in annual revenues to $2.67 billion from $2.43 billion, a gain credited to European operations and higher service revenues.

Wang relied on plant consolidations and continued work force reductions to stem the losses. Its widely held Class C stock fell to a low of $10.75 from $29 a share late in the year. Profits suffered from hamstrung sales of high-margin VS 300 systems, which were beset by operating system bugs. It wasn't until a third-quarter revision alleviated the problems that volume shipments could begin.

As part of his plan to improve results, Wang chairman An Wang replaced executive vice president for worldwide sales J. Carl Masi, taking personal charge of worldwide sales and marketing. The change wasn't to last the year. As lackluster U.S. sales continued to sap Wang's finances, elder son Frederick A. Wang took over from his father as president. U.S. sales and marketing assumed a decidedly European accent as Wang Europe senior vice president Ian Diery took over U.S. operations.

Despite management changes, Wang pressed ahead with a three-pronged strategy to boost its role and visibility in the dp market: Wang will concentrate on services, voice and data integration, and systems integration. The company kicked off its first formal software service program, and acquired for about $156 million in stock the outstanding shares of PBX maker InteCom Inc., Allen, Texas.

Wang's systems integration focus produced joint marketing agreements with Apollo Computer Inc. and Sun Microsystems Inc. in the CAE and CAD/CAM markets; and with Texet Inc. and Aldus Corp. in the electronic publishing market.

Outside the U.S., Wang's European and Canadian subsidiaries led the corporation into applications sales using software acquired from third-party developers. Such systems integration efforts resulted in a $34 million (Canadian) contract to provide British Columbia with systems and software for road mapping and design, and a five-year, up to $480 million pact to furnish the U.S. Air Force with resource-sharing VS computers, software, and network connections to IBM mainframes.

Revenue figures are in millions of dollars. Each increment represents $100 million.

13

TOSHIBA CORP.

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Minato-ku, Tokyo 105, Japan
(81-3) 457-2105

Last year marked a strategic turning point for Toshiba, with management changes and a new focus on data processing. The high price of the yen kept overall corporate revenues essentially flat, with profits down 41%. Dp was one of the company's bright spots, however, with sales increasing an estimated 15% to ¥439 billion ($2.6 billion), about 13% of total revenues.

Without the runaway success of the T2100 and T3100 PC-compatible laptop computers, dp results wouldn't have looked so good. More than 140,000 were sold, three fourths in the U.S., boosting Toshiba's total pc revenues to ¥98 billion ($581 million). A version with Japanese language MS/DOS was introduced domestically in November and sold 10,000 in its first two months.

A couple of important holes in the dp product lineup were plugged. The company announced an agreement to market two models of AT&T's System 75 medium-capacity digital PBX, the TX-8200, which can control up to 320 circuits, and the TX-8500, which can handle 800. The agreement builds on that of the previous October for the marketing of AT&T's Datakit virtual circuit switch, and allows Toshiba to offer comprehensive data networks of various sizes, since the company's own PBX products can handle only 120 lines. Another space filled by a foreign product is the engineering workstation slot, for which the Sun Microsystems Sun-3 is being imported. The machine was first used only internally, but last year the company added some Japanese software and began marketing it as the AS 3000 series.

The PBX and the workstation don't contribute much to revenues, but they are key products in Toshiba's positioning strategy. Since it doesn't sell mainframes, the company is trying to offer its machines and networks as comprehensive systems that can support and connect any type and number of mainframes.

Top level personnel changes accompany the company's new dp/systems orientation. Sugiichiro Watari, who succeeded Shoichi Saba as president on April 1, was charged with implementing the new integration strategy. New heads for the industrial electronics and information systems groups were also named.

Exports decreased because of the expensive yen, but overall sales of peripherals, microcomputers, and data communications equipment rose 21%, to ¥310 billion ($1.84 billion). Domestically, the so-called personal word processor, a typewriter-like machine with LCD screen and memory, did well, as did the TOSFIL optical document filing system.

Revenue figures are in millions of dollars. Each increment represents $100 million.

14

GROUPE BULL

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75116 Paris, France
(33-1) 45 02 90 90

When Honeywell Inc. said it would restructure its dp interests, Bull had no choice but to seize the opportunity of a more stable relationship with its erstwhile partners, Honeywell Information Systems (HIS) and Japan's NEC. Bull and NEC, tied to HIS by technology exchange agreements, were both prime candidates for taking over their partner in order to retain control of their technology and their destinies.

As dominant partner in the new U.S. affiliate Honeywell Bull Inc., Bull is thought to have gotten a bargain for its $130 million outlay. It now has a 42.5% stake and is expected to amass a 65% holding within two years.

After years of financial woe, Bull is relatively healthy. Its debt-to-equity ratio was down to 1.6:1 by the end of 1986, compared to 8:1 in 1983. The HIS buy absorbed 30% of the funds Bull earmarked for investments in 1987.

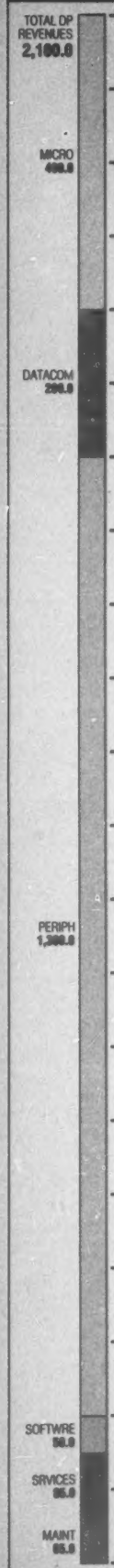
The company met its earnings target in 1986, despite sluggish markets that depressed revenue growth to 10.5% instead of the hoped for 15%. Earnings jumped 146% to FF271 million ($39.1 million), representing a margin of 1.5% on revenues of FF17.8 billion ($2.6 billion). Export revenues increased at a slower pace than domestic sales due to the depreciation of the dollar. West Germany remains Bull's biggest export market, contributing 25.3% of foreign revenues, followed by the Benelux countries (20%), Scandinavia (11.7%), and the Iberian peninsula (10%). Bull opened so-called "competence" centers in Spain for banking systems and in Norway for networking and was given the go-ahead to set up manufacturing facilities in Argentina.

Starting with the introduction of the AT-compatible Micral 60 in January 1986, Bull pushed out a stream of new products. Mainframe, minicomputer, and workstation lines were enlarged and upgraded, with particular attention to systems software and networking.

Bull reaffirmed its commitment to existing oem suppliers such as Convergent Technologies and Ridge Computer, but no new product families were born. Bull also restructured its small systems business by merging the Micral micro group, the Transac workstation division, and its Sems scientific mini supplier into a single subsidiary called Bull MTS.

The brightest star in 1986 was the company's smart-card subsidiary, Bull CP8, which doubled revenues to FF240 million ($34.6 million) and moved into profitability. The Norwegian banks signed a contract for 500,000 cards in November 1986, but the French banks and PTT still account for the bulk of CP8's orders.

Revenue figures are in millions of dollars. Each increment represents $100 million.



15

XEROX CORP.

P.O. Box 1600
Stamford, CT 06904
(203) 329-8700

Document processing is the byword at Xerox Corp. these days: late in 1986, the company created a new Business Products and Systems Group responsible for most of the product planning, development, and manufacturing previously carried out by the Reprographics Business Group and the Xerox Systems Group. Paul A. Allaire, named Xerox president in mid-1986, says the strategic focus of the new group "will be on document processing, which incorporates xerography, advanced electronics, and computer systems to create, reproduce, print, distribute, and file documents in either paper or electronic form. Our document processing strategy requires that we treat reprographics and systems as unified resources rather than as separate technologies."

DATAMATION estimates that sales of Xerox's information processing products were up 7% to $2.1 billion. That was not good enough to offset an overall earnings decline in the Business Products and Systems Group. While revenues for the new group grew by 8% to $9.35 billion (representing more than 70% of total corporate revenues), its profits were down to $260 million, a drop from 1985 profits of $351 million by the Reprographics Business and Xerox Systems groups.

Allaire blames the earnings drop on a drop in capital spending both in the U.S. and overseas and said actions have been taken to cut overhead, including a hiring freeze and an early retirement offering. Xerox also stopped selling pcs for general use, and now sells them only as part of desktop publishing systems.

The firm named a new vice chairman, Melvin Howard, whose background is in financial services. Xerox Financial Services Inc. has seesawed for the past three years: in 1984, financial services provided the company's only profit growth; in 1985, it dragged down profits; in 1986, it rebounded to account for fully 47% of total corporate profit on 30% of corporate revenues. This group includes Crum & Foster, Xerox Credit Corp., and Van Kempen Merritt Inc.; it grew 19%, to $3.6 billion. Total corporate earnings in 1986 were $465 million on revenues of $12.9 billion. In 1985, Xerox earned $475 million on revenues of $11.6 billion.

Xerox chairman David T. Kearns is optimistic: "We're going toe-to-toe with the Japanese and with our domestic competitors in the document processing market," he told a group of financial analysts early this year. "We also have a strong base in financial services and we'll continue to grow our business on both sides of the company."

Revenue figures are in millions of dollars. Each increment represents $100 million.

16

AT&T CORP.

550 Madison Ave.
New York, NY 10022
(212) 605-5500

After yet another depressing year in the dp business, AT&T got a spring break in 1987. When senior vice president Vittorio Cassoni, AT&T's Olivetti-bred computer chief, talked to the press about dp strategy and some new products, the stock market heard and was impressed, raising stock prices. In his message to stockholders in the 1986 annual report, James E. Olson, new chairman of the board, acknowledged AT&T's problems: "... it became clear that the company was on the right road but in the wrong lane." Also in 1986, the one-time cradle-to-the-grave employer announced it would cut staff by 32,000.

Still, because the company dominates the businesses of long distance calling and central office switching, there is no shortage of cash flow here. In 1986, AT&T's services revenues, most of it long distance, hit $19.1 billion, up 10% over 1985; of this, 47% was allocated to costs, also an improvement over 1985 when costs took 52% of revenues. Last year, AT&T also regained market share in the central office switching business, edging back toward 60% of the market, as it profited from main competitor Northern Telecom's software problems.

The good business in switching helped mask AT&T's computer problems. The company reports all its hardware sales together, from modems, handsets, and digital switches to minicomputers and pcs. In 1986, revenues in this segment were off $1 billion to $10.2 billion, 9% lower than 1985, while costs were up slightly, to 71% of revenues.

DATAMATION estimates that revenues from dp products were $2.1 billion, a 5% increase over 1985. Increased pc sales were offset by slumping sales of 3B computers.

To turn AT&T's dp operation around, Cassoni announced a five-pronged strategy directed at various-sized work groups, from networked pcs to corporate data systems, with solutions based on de facto and AT&T standards. He delivered some good news about Unix, saying the industry's 1986 shipments of Unix machines were 75% over 1985's and claimed AT&T has 14% of this market. He announced a new 3B2 computer, price cuts on existing 3B computers, and the prediction that AT&T could soon position itself as "the low-cost minicomputer vendor."

The company also announced it would all but abandon its midtown Manhattan headquarters, leaving only 300 staffers in the showplace skyscraper and retreating to Basking Ridge, N.J. However, New York City threatened to file suit and the move was put on hold.

Revenue figures are in millions of dollars. Each increment represents $100 million.

17

NIXDORF COMPUTER AG

Furstenallee 7
4790 Paderborn, West Germany
(49-5251) 150

Nixdorf Computer survived the sudden death of founder Heinz Nixdorf in March last year. Revenues rose 14% to DM4.5 billion ($2.1 billion), with net income increasing at an even faster rate.

Nixdorf reported strong growth in both domestic and international markets. At home in West Germany, it retained its number three ranking behind IBM and Siemens. In the U.S., Nixdorf made a breakthrough in its attempts to sell integrated systems rather than individual boxes when it scored a $100 million sale to retailer Montgomery Ward, its biggest deal in more than 18 years of American marketing.

Nixdorf was also successful in the European banking market, claiming to be Europe's biggest supplier of computer banking equipment. Its ATMs and cash dispensers accounted for DM1.5 billion ($690 million) of 1986 sales.

Chairman Klaus Luft expects growth to come increasingly from telecommunications and software products. The company first offered telecommunications switching systems in 1982 and now claims 10% of the West German PBX market, with more than 3,000 switches delivered. Nixdorf's 8818 digital ISDN switching system is available in 11 countries and is being used in ISDN pilot projects in West Germany.

New hardware was added at both the top and bottom ends of Nixdorf's Targon range of Unix systems, expanding performance from 1MIPS to 12MIPS. There were also additions to the company's 8890 small mainframe series running the proprietary NIBOS operating system, as well as additions to terminal, data communications, and telecommunications lines.

To support its expanding business, Nixdorf hired 2,300 more workers, bringing the total number of staff to just under 26,000 worldwide. Plans to employ 2,000 more people during 1987 are on the books. Nixdorf boosted its capital spending to DM646 million ($298 million) last year. And not only did the company expand its main plant at Paderborn, it also opened a new factory in West Berlin to make electronic components and magnetic disks.

In October, Nixdorf returned again to the stock market, with a one-for-six stock offer worth DM640 million ($294.9 million). Though the company first went to the open market in 1984, the Nixdorf family continues to control voting stock. The new money will be used to repay short-term debt and for new investments, particularly in software and communications technologies. R&D spending reached DM427 million ($196.8 million) last year, more than 9% of total revenue.

Revenue figures are in millions of dollars. Each increment represents $100 million.

18

APPLE COMPUTER INC.

20525 Mariani Ave.
Cupertino, CA 95014
(408) 996-1010

After its soap opera year of 1985, Apple Computer Inc. staged a stunning turnaround in 1986. Among its accomplishments: the highest profits in its corporate history, the unveiling of higher-powered Macintosh and Apple II microcomputer systems, the acceptance of Apple's desktop publishing solutions inside Fortune 500 companies, and the successful out-of-court settlement of its lawsuit against cofounder Steven Jobs. The only fly in the ointment was flat revenues for the fiscal year, ended Sept. 26. Apple came back slugging, however, in 1987's first fiscal quarter, ended Dec. 26, with a 24% boost in net sales.

For calendar year 1986, Apple earned $155.3 million or $2.39 a share, more than double the $72 million earned a year earlier. Revenues for the year were just over $2 billion, up nearly 16% over 1985. For the first fiscal quarter 1987, Apple's revenues reached $662.3 million (still below the $698.3 million peak it hit two years earlier) with flat earnings of $58.5 million, or 91 cents a share.

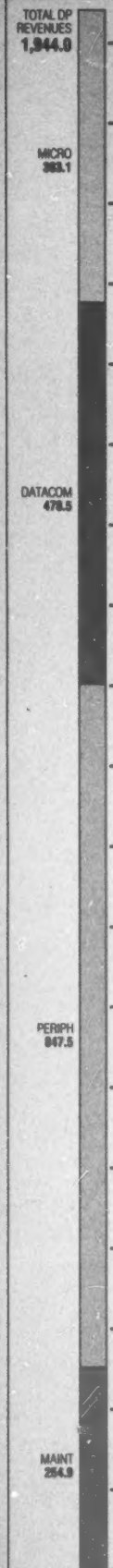
Apple's cost-cutting moves of 1985 were a key reason for last year's much improved earnings. Earnings are expected to flatten for several quarters in fiscal 1987, however, due to Apple's aggressive product plans. With these products, Apple hopes to keep ahead of IBM, which is also improving its graphics options and making a push for Apple's niche markets of desktop publishing and education.

Since January 1986, the company has spun a breathtaking skein of major new product introductions. On Jan. 16, Apple unveiled the LaserWriter Plus printer and the Macintosh Plus, which offered twice the memory of its predecessor. September 1986 marked the introduction of the Apple IIgs. This updated version of Apple's oldest product line sported snazzy graphics and sound capabilities. Apple ran into a slight snag cranking up IIgs manufacturing, but it is said to be back on track.

The new products kept rolling in January 1987, with a new version of the Apple IIe. The real powerhouses were unveiled in March 1987: the Macintosh SE (System Expansion) and the Macintosh II, the so-called Open Mac. These systems offer the open architecture and expansion capability needed by third-party developers, and feature Apple's first Unix and MS/DOS options.

Last year also marked the first time that Macintosh revenues outdistanced those from the Apple II family. "We are no longer dependent on one product for the majority of our profits," states Apple head John Sculley.

Revenue figures are in millions of dollars. Each increment represents $100 million.



19

MATSUSHITA ELECTRIC INDUSTRIAL CO. LTD.

1006 Kadoma, Kadoma City
Osaka 571, Japan
(81-6) 908-1121

In 1986, Matsushita executives had to take part of their year-end bonuses in company products. Dp sales were off about 5% to ¥327.6 billion ($1.94 billion) while total company sales fell about 1% to ¥4.99 trillion ($29.6 billion). Dp's contribution to overall revenues remained the same at about 7%. Increasing that ratio is the job of new president Akio Tanii. VCRs, the company's star earners, have been hard hit by the rising yen, a mature market, and cheap competition from Korea, with sales down 20% overseas and 13% domestically.

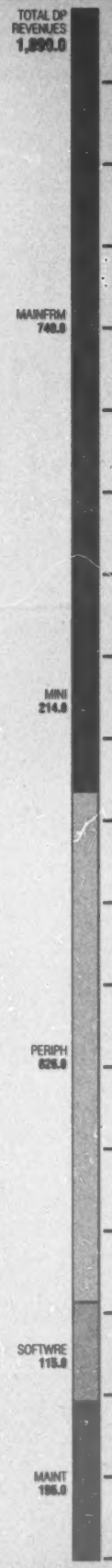
Tanii inherits the third and final year of the "Action 61" program initiated by former president Toshihiko Yamashita to move the company more aggressively into factory- and information-oriented electronics. It's driven by R&D and funded by about 5% of sales, 70% of which goes to business and industrial products.

Emphasis on semiconductors is another key element. In October 1985, a Semiconductor Research Center was opened in Osaka with a staff of over 200, to bring semiconductor R&D into the main company from subsidiary Matsushita Electronic Corp. The next October, the company announced plans to invest in SAE, a Delaware engineering firm, with which it will jointly develop a high-speed microprocessor.

Microprocessors were part of a larger plan to move back into the computer field. In January, it linked up with Kyoto University to develop a parallel architecture supercomputer. Development of a hospital computer system based on optical storage media, both disks and cards, also began. In the industrial area, the company developed an AI-based system that can convert handwritten drawings and numbers into data for input into a CAD machine.

Overseas activities will also be important, both because of exchange rate difficulties and as a way to lessen trade frictions. The company's nearly 50 manufacturing facilities in 26 countries outside Japan account for 14% of total production. With 34% of domestic production being exported, though, there is still plenty of room for more offshore manufacture; by 1990, the company plans to increase overseas production to 25% and export only 25% of domestic production. One such move in 1986 was the start of VCR and color tv production at a new factory in Vancouver, Wash. Construction of the company's first overseas plant for office equipment began in Wales, to be run by newly formed U.K. subsidiary Kyushu Matsushita Electric. The 1987 production target is 20,000 electric typewriters and 50,000 printers.

Revenue figures are in millions of dollars. Each increment represents $100 million.



20

HONEYWELL INC.

Honeywell Plaza
Minneapolis, MN 55408
(612) 870-5200

In 1986, Honeywell made a hasty and costly retreat from the computer business. Competing with IBM in the mainframe arena and coping with the industrywide sales slump became just too much. Instead of fighting a losing battle, Honeywell sold a majority interest in its Honeywell Information Systems (HIS) to longtime business partners Groupe Bull of Paris and Nippon Electric Corp. (NEC) of Tokyo.

The new venture, called Honeywell Bull Inc., is the first major computer entity owned jointly by U.S., European, and Japanese partners. Honeywell, which still has a 42.5% share of the new business (Groupe Bull also has 42.5%, while NEC owns 15%), plans to reduce its stake to 19.9% by the end of 1988. Jerome J. Meyer, who had been executive vice president of HIS, is the new president and ceo. Jacques Stern, chairman and ceo of Bull, is chairman of the new board of directors.

Financial terms of the deal were announced in December, setting off waves of criticism that Honeywell had sold out too cheaply. For 57.5% of HIS, Honeywell received $527 million in cash. Those figures were tough to match up to HIS's 1985 revenues of $1.63 billion. Excluded from the deal because of foreign ownership concerns was Honeywell's $250 million Federal Systems Division.

Overall revenues at Honeywell, not counting the restructuring, were $7.1 billion, a 7% increase over 1985. Dp revenues were down slightly, to $1.89 billion. Net income was $9.6 million, a far cry from 1985's $281.6 million. In its own financial statements, restated to reflect HIS as a discontinued operation, Honeywell reported a loss of $398.1 million, or $8.83 per share, on revenues of $5.4 billion. The disposal of HIS alone accounted for a loss of $407.7 million. By focusing on its remaining businesses—aerospace, defense, home and industrial automation and controls—Honeywell chairman and ceo Edson Spencer promises that earnings in 1987 will exceed $5 per share.

Despite the Wall Street maneuvering, Honeywell found time to work on computers. In June, it introduced new models of the DPS 6 Plus family of 32-bit minicomputers that are expected to help the new Honeywell Bull break into niche markets. But Honeywell also became embroiled in an industry dispute it would have preferred to avoid. After winning a multimillion-dollar contract to sell the NEC-designed DPS 90 computer to the Air Force, rival Control Data Corp. vociferously accused the two companies of dumping. Both Honeywell and NEC strongly deny those allegations.

Revenue figures are in millions of dollars. Each increment represents $100 million.

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N.V. PHILIPS GLOEILAMPENFABRIEKEN

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Like many of its European colleagues, Philips suffered from the weak dollar and reported a decline in local currency revenues. The company as a whole reported an 8% drop in sales revenues to G55 billion ($22.5 billion), but still achieved a 10% gain in net income of G1 billion ($414 million). Revenues at Philips' Telecommunications & Data Systems Division actually dropped about 5% from the year before, to G4.3 billion ($1.8 billion).

Philips president Cor van der Klugt, who took over from the retiring Wisse Dekker early in the year, admits that the company is still striving to improve productivity and will cut jobs to achieve its aim. It also plans to move assembly lines around the world to gain local advantage when fluctuating exchange rates raise costs and lower revenue.

The Telecommunications & Data Systems division, formed when the company's dp and business communications interests were merged in 1985, is proving to be slow to reach its full potential. Division head Gert Bindels says, "The integration of the two divisions should have been completed by the end of 1986, but the two different cultures have still not melded completely."

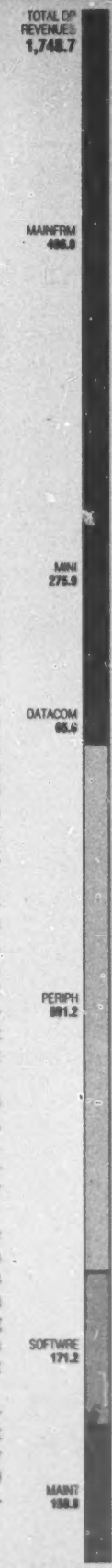
Sophomation, Philips' strategic product line comprising wide and local area networks, a digital PBX, processors, software, and terminals, generated 30% of the company's dp revenues. Bindels expects that percentage to double by the end of 1988. Products like Philan, the fiber-optic local area network that was under test last year, are expected to make a significant contribution.

Philips acquired Bunker Ramo's sales organization in West Germany and Switzerland, giving it a handle on the local banking markets. In Japan, Kyocera Corp.'s share in the joint venture selling Sopho-Net was taken over by Philips.

Other joint ventures continued. In the U.S., Philips opened Laser Magnetic Systems with Control Data in Colorado Springs. Philips contributed CD-ROM activities and Control Data expertise in magnetic tape reading and writing devices to the new company. In Europe, Philips pushed ahead with Siemens on its joint megabit memory chip project.

New in 1986 were XT- and AT-compatible pc models. But the most important recent product additions made by Philips arrived early in 1987 when the company launched its P9000 workstations, confirming an early but previously unfulfilled commitment to Unix.

Revenue figures are in millions of dollars. Each increment represents $100 million.



22

STC PLC

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STC staged a remarkable recovery through 1986, going from 1985's after-tax loss of £53.8 million ($69 million) to a 1986 profit of £103.1 million ($151.6 million). The gain was made despite a marginal decrease in total revenues to £1.9 billion ($2.8 billion, inflated by a weak dollar) from 1985's £2 billion ($2.6 billion).

ICL, STC's brightest star and the U.K.'s largest computer maker, saw its revenues grow by nearly 15% to £1.2 billion ($1.7 billion), assisted by favorable exchange rate movements. Sales of the Series 39 mainframes also helped, making their first full year's contribution to revenues. Cost reductions and increased sales resulted in a 46% gain in ICL operating profits of £90.2 million ($132.6 million).

The measures taken by STC to return the group to profit in 1986 followed the austerity plan set out in 1985. Among the businesses to be sold was most of International Aeradio, which STC bought from British Airways in 1983. STC retained only the data communications business. In May, STC sold its Foots Cray semiconductor facility to LSI Logic Europe, bringing the total cash raised from divestments to about £100 million ($147.1 million).

Much of the year's activity at ICL was in developing joint ventures and partnerships to take the company into new markets. Early in 1986, ICL agreed to adopt Computer Consoles' OfficePower software as the key to its departmental systems. It also signed for Cincom's Mantis fourth generation language.

The value-added network (VAN) services business was boosted by a tie-up with GEISCO and by a new shipping service on ICL's Tradanet VAN. Concentrating on core businesses, ICL spun off most of its distributed array processor business to a new company, Active Memory Technology. ICL retained only defense-related work, consolidating it into a new division.

Product additions during the year included new Series 39 mainframe models, as well as enhancements for the One Per Desk integrated terminal and the DRS300 office systems. Making a move away from proprietary operating systems, ICL put Digital Research's Concurrent DOS with GEM on the DRS 300. In the U.S., ICL broke into the Unix market with the Clan multiuser computer in October.

Having cleaned up the balance sheet, STC is on solid ground for the coming year. But it is still the subject of some speculation—last year's rumors of a possible takeover bid from British Telecom or Siemens have not died out as quickly as STC might have hoped.

Revenue figures are in millions of dollars. Each increment represents $100 million.

23

TRW INC.

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This diversified conglomerate sells consumer information services, maintains other vendors' hardware, and designs and builds military and space-related information systems. TRW says information systems has become the most profitable and fastest growing part of the company.

Total revenues in 1986 for information systems and services were $1.63 billion, up from 1985's $1.45 billion. Total corporate revenues for 1986 were $6.04 billion, up from $5.92 billion in 1985. Earnings from continuing operations were $218 million.

Computer services, concentrated mainly in the areas of credit and real estate information reporting, brought in $250 million, up from $175 million a year earlier. In 1986, TRW acquired Teknekron Financial Systems Inc., which provides image processing systems and services to banks. The company is expected to have sales of about $50 million in 1987. Revenues from hardware maintenance services, totalling $175 million, were essentially flat compared with 1985. TRW also launched Credentials, a consumer credit information service. It enables individuals to monitor requests for their credit histories and to ease their future credit requests by filling out a master credit application. The company claims that more than 150,000 California families have signed on in the first year.

Most of the firm's data processing business is military related, however. The company has benefited from Strategic Defense Initiative contracts, under which it has developed, among other things, artificial intelligence-based command and control systems. TRW Federal Systems Group won a $98 million contract in January 1987 to reprogram AWIS, the U.S. Army's worldwide communications system, with the language Ada.

The company last year set up a Technology Systems Organization to commercialize management techniques and technologies first developed for the military. One of the first of those products to be sold commercially is a computer modeling system designed to help determine manpower requirements and schedules for software development projects. Another military system with seemingly strong commercial potential is a text searching system that relies on "massively parallel" processing. The Fast Data Finder, based on an internally developed processor chip, is said to scan text at a rate of up to 7 million characters a second.

The company also develops and installs specialized local networks and has expertise in designing secure communications systems.

Revenue figures are in millions of dollars. Each increment represents $100 million.

24

TANDY CORP.

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The pc was heralded as the first computer for the masses. But in the market-wise, niche-oriented world of the '80s, it didn't quite work out that way. With IBM staking out the corporate world and Apple cultivating the yuppie set, commoners have been getting short shrift. Enter Tandy, which, in 1986 at least, was clearly the superior choice of the masses.

Two years ago, Tandy was on the ropes. A lackluster product line, a home market gone flat, a dubious attempt to jump on the IBM-compatible bandwagon—nothing went right.

But Tandy confounded its critics and executed a sparkling turnaround. In 1986, dp revenues grew 30% to just over $1.5 billion; computers now account for nearly half of total sales. Analysts rank Tandy number three in pcs, behind IBM and Apple. Wall Street took notice of Tandy's changed fortunes and ran the price of its stock up to the high 40s, the highest it's been since 1983. To top it off, the 1986 Tax Reform Act lowered the company's tax rate, prompting Tandy to pay its first dividend to stockholders since it went public in 1960.

The name of the game at Tandy is marketing. Its Radio Shack chain of consumer electronics stores now numbers over 7,000, including 400 with computer centers. All the stores are directly owned or franchised, giving Tandy a low-cost distribution network that is the envy of any pc supplier.

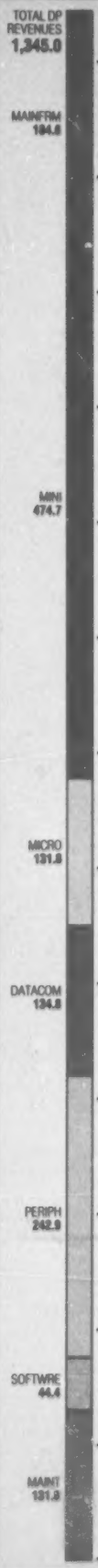
Tandy's other high card is low-cost manufacturing. For its computer line, Tandy does just about everything, from molding the cabinets to manufacturing the circuit boards and power supplies. Tandy's assembly line in Fort Worth was running seven days a week last fall to keep up with shipments of from 60,000 to 70,000 computers a month.

In 1986, Tandy introduced new versions of the PC-compatible Tandy 1000, one for the home and another for small businesses; the Tandy 3000 HL, an XT-compatible computer; and a new version of the AT-compatible Tandy 3000 HD with a 40MB hard disk.

Tandy is countering inroads by Asian-made clones by positioning itself as the quality supplier at the low end, emphasizing its reputation for quality and nationwide service and support. Efforts to appeal to the corporate market have yet to pay off, but Tandy is still trying. A new sales force, 1,900 strong, was established to go after corporate accounts.

Tandy chairman John Roach says he is unfazed by IBM's new PC line. At $1,695, the lowest priced model poses little challenge to the Tandy 1000, which goes for $1,000 or less.

Revenue figures are in millions of dollars. Each increment represents $100 million.



25

MITSUBISHI ELECTRIC CORP.

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Mitsubishi Electric, or MELCO, didn't do well overall in 1986. Calendar year revenues were off 1.3% and were headed downward to an estimated 3% drop for the fiscal year that ended this March. Profits were off 52%. Dp products contributed to the only division showing increased sales: Information and Communications Systems and Electronic Devices, up 3%. DATAMATION estimates Mitsubishi's 1986 dp revenues to be ¥226.6 billion ($1.34 billion), up 2% over 1985. Meanwhile, Mitsubishi's heavy electrical, consumer products, and industrial and automotive divisions sagged.

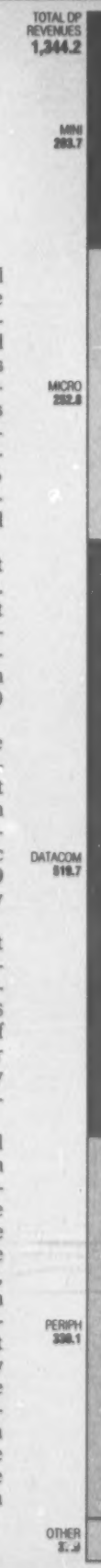
Semiconductors weren't as weak a spot for MELCO as for some of its competitors. Thanks to the extremely modern equipment at its Saijo IC plant, the U.S. Department of Commerce assigned MELCO's memory chips a relatively low fair market value (the price at which the U.S. says they can be sold outside Japan) under 1986's semiconductor trade agreement.

The company's only overseas sales are done through oem arrangements. Its arrangement to supply pcs to Sperry remains in effect despite the Burroughs merger. The other main dp export category is floppy disk drives. Neither area is offering much growth, however: pc production stayed even this year at 140,000 units, while floppy disk drives were up by only 100,000 to 1.3 million.

The only computer category that showed any real growth was that uniquely Japanese product, the office computer, a minicomputer-sized machine with proprietary OS suitable only for a narrowly defined range of business tasks. Sales of fax machines, the other quintessential Japanese OA product, grew by one half to 30,000, although the move to lower-end products did squeeze profits.

Although Mitsubishi has made a small name for itself in the minicomputer market as a supplier of excellent, low-cost hardware for scientific and university users who plan to write their own software, sales in this category were almost flat in 1986. The same holds true for the Prolog-based PSI workstation designed by ICOT, the government-sponsored fifth generation project. MELCO supplied machines for the project's internal use, but commercial sales didn't materialize, despite intriguing rumors that New York financial firms were looking into using the machines in the securities business. Persevering, the company announced it would begin marketing the next ICOT machine, the more compact PSI-II, this spring. In November, the company also said it would be coming out with an 80386-based pc this year.

Revenue figures are in millions of dollars. Each increment represents $100 million.



26

TELEFONAKTIEBOLAGET LM ERICSSON

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Ericsson's sales of SKr31.6 billion ($4.4 billion) were down more than 2% from 1985. With 80% of production headed for export markets, the continuing fall of the dollar leaves the company especially vulnerable. But, leaner than in the past, the company pushed its net income up by 14% to SKr378 million ($53.1 million).

With the exception of Ericsson Information Systems (EIS), the company's operating divisions remained profitable. After two years of sizable losses, the computer subsidiary managed to reduce its deficit to SKr284 million ($39.9 million) last year from SKr806 million ($113.2 million) in 1985.

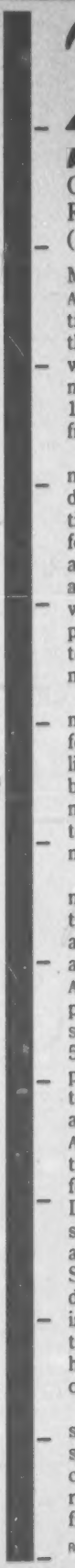
EIS president Stig Larsson admits to missing the target he set himself when taking up the reins at EIS in January 1985. Then, he predicted EIS would break even by 1987. Now, company executives believe EIS will be profitable again early in 1988. Among last year's efforts to enhance the company's standing was a reduction in staff numbers by about 3,000. EIS's key product is the digital MD-110 PBX, which can handle both voice and data communication. It can be configured with over 100,000 lines and last year found export success in China, Finland, the U.S., and other countries.

Ericsson was less lucky in the public switching equipment market, where, despite a gentle climb in sales to SKr11.5 billion ($1.6 billion), income dipped to SKr1.2 billion ($163.2 million) from SKr1.3 billion ($180.1 million). The company attributes the drop in income to the cost of developing its AXE digital switch for the U.S. and U.K. markets; it blames slow sales on increasing competitive pressure in the public switching arena.

On the computer side, Ericsson is still feeling the aftereffects of its 1985 fiasco in the U.S. market. But it is recovering well in the European market. Its pc products have a 14% market share in Sweden, giving EIS second place behind IBM. And in the portable pc sector the company has a stronger hold, taking a 22% market share. Its portable products are built in Japan by Matsushita.

To strengthen its product line in the banking sector, Ericsson signed a joint product R&D agreement with Digital Equipment Corp. in September. Ericsson is contributing expertise in communications, workstations, and banking applications software to the venture, while DEC is expected to put its office automation, networking, and computing knowledge into the common pool. Products will be sold by each company under its own label.

Revenue figures are in millions of dollars. Each increment represents $100 million.



27

AUTOMATIC DATA PROCESSING INC.

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(201) 994-5000

More companies in the industry should have ADP's worries: 1986 marked its 37th consecutive year of increased revenues and earnings. If there is another company in corporate America with such a track record, please stand up. Revenues climbed to $1.3 billion from $1.1 billion in 1985, while net income rose to $115.5 million, from $95.3 million.

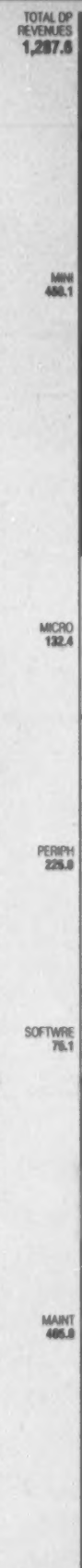
Significant activity in 1986 concerned management changes and new product introductions. In April, Josh S. Weston, chief executive, became chairman when Henry Taub, a founder of ADP in 1949, retired with the honorary title of chairman emeritus. William Turner, a former executive with Texas Instruments who joined ADP several years ago, was named president, succeeding Weston. Together, Weston and Turner formed an Office of the Chairman.

Acquisitions, a mainstay of ADP's business strategy historically, tapered off in 1986 following February's $40 million purchase of Allied Signal's Bunker Ramo Information Systems brokerage service business. In May, the company sold Bunker Ramo's U.S. banking operations to Ing. C. Olivetti & Co. S.p.A. of Italy for $17 million.

Division by division, the year was pretty much steady as she goes. Employer Services, the payroll and tax filing unit and ADP's oldest and largest business, continued to represent about 45% of the company's business overall. ADP introduced a microcomputer-based, on-site payroll product. A National Accounts program, started in 1985 to target companies with over 500 employees, emerged as the fastest-growing part of Employer Services last year, according to Arthur F. Weinbach, senior vice president of administration and finance. Brokerage Services, ADP's second largest business, displaced Quotron by winning a contract with Merrill Lynch for IBM AT-based front-office services. And Dealer Services, about 10% of the company, scored with an exclusive agreement to provide automotive-related services to Hyundai of South Korea. The Collision Estimating Services division introduced Atlas, a system designed for insurance adjusters. The ATM Services unit entered a joint venture with Bank of America to handle 400 ATMs operated in Southland Corp. outlets.

Other major financial activities were the sale in February of $150 million in convertible subordinated debentures, a two-for-one split of common stock, and an increase in the authorized number of common shares to 200 million from 80 million.

Revenue figures are in millions of dollars. Each increment represents $100 million.



28

DATA GENERAL CORP.

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(617) 366-8911

Data General's engineering prowess has enabled it to sprint beyond competitors in price/performance. Yet, financially, Data General last year was running in place. Poor U.S. demand for its computers, especially in industrial sectors, produced flat revenues overall and a $26.8 million loss for the calendar year. Sales for the 12 months were $1.28 billion, a 7.4% increase over 1985.

DG president Edson de Castro attributes the worsened financial picture to a temporary change in the way customers view technical criteria: users, he says, have grown less concerned with price/performance and instead seek safe harbors among larger and financially stronger vendors. "In the 'up' cycles, people forget about the fact that business gets lousy," says de Castro. "They're looking for the best buy they can get. . . . Those are the cycles [in which] we can grow market share."

With no clear picture of when the upswing will occur, Data General last year implemented a second round of employee cutbacks, quit volume semiconductor manufacturing, and closed peripherals plants in Austin, Texas, and Hong Kong. Engineering staff shortages were blamed for the demise of a high-end engineering workstation, the DS/7700. The workstation, designed to support a multiprocessor architecture, was canceled after introduction—a result of irremediable technical problems.

The company favored additions to sales personnel and communications engineering as near- and long-term fixes for flat sales. The Communications Systems Group will develop high-speed networks based on optical technologies and produce a private branch exchange integrated with DG's Eclipse/MV computers. The group will also oversee investments in wide area network supplier Dama Telecommunications Inc., semiconductor startup Actel Inc., and digital PBX developer Genioss Inc.

The company completed release of a third generation of Eclipse/MV computers. The 32-bit line gained new strength with the MV/7800, based on a chip set implementation of the MV architecture, and the three-member MV/15000 series, derived from MV/20000 processor technology. It brought users of its 16-bit systems further into the Eclipse/MV family with release of a 32-bit version of its Real-time Disk Operating System (RDOS).

While others now may pass him by, de Castro is content to run in place as long as it's understood there's a future contest to be won. "If we're sitting with the best price/performance . . . we'll go up," he says.

Revenue figures are in millions of dollars. Each increment represents $100 million.

29

MCDONNELL DOUGLAS CORP.

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McDonnell Douglas's Information Systems Group (ISG), which specializes in services and systems for numerous vertical industries, had revenues of $1.19 billion for 1986. But for the third year in a row, the group operated at a loss. This time it was $69.7 million, which at least showed some improvement over last year's figures, a $109.3 million loss on revenues of $1.1 billion. The corporation as a whole earned $277.5 million on revenues of $12.66 billion, and said it was affected by the overall "slowdown" in data processing markets.

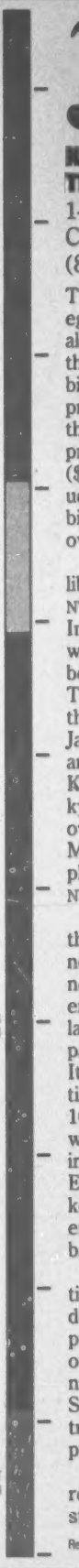
Nevertheless, because of cost-cutting, McDonnell Douglas's information processing businesses managed to show a profit in the fourth quarter of the year, the first pretax earnings for ISG since the group was organized. In fact, the ISG would have showed a profit of $18.2 million in 1986 were it not for the rapid amortization of certain previous acquisitions. Those include Microdata, a veteran maker of small business systems based in Southern California, and Tymshare, a pioneer in the remote computing services sector.

Four years ago, McDonnell Douglas joined those and other businesses with its own remote computing services, primarily geared to engineering and health care markets, and formed ISG. But it has thus far been unable to make the computer business a positive contributor to the bottom line, with the vast majority of the corporation's revenues stemming from military and commercial aircraft production. (A small percentage of ISG's sales are to other McDonnell Douglas units, but the company says these sales are on a commercial basis, in competition with other vendors.)

No major organizational changes took place at ISG during 1986, but Jeremy J. Causley was named an ISG executive officer. Causley, formerly president of the computer operations' international marketing arm, joined McDonnell Douglas as a top executive at Microdata. He replaces the departing Robert A. Fischer.

Under Causley, ISG continued its efforts to cut costs and to sharpen its marketing focus on its specialty markets, which include health care, manufacturing, communications, and banking. Thus ISG sells systems and services for physician and hospital billing, for manufacturers needing computer aided design and manufacturing, and for credit and bank card authorization. It also provides systems integration services, a public data network, and field maintenance services for its own and other manufacturers' computer equipment. The group is active in 14 foreign countries.

Revenue figures are in millions of dollars. Each increment represents $100 million.



30

NIPPON TELEGRAPH AND TELEPHONE CORP.

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The biggest thing that happened to Nippon Telegraph and Telephone Corp. (NTT) in 1986 has also been called the biggest thing to happen to the Tokyo stock market in this century. When bids were taken in the fall to decide the selling price for the first 12.5% (1.95 million shares) of the stock to be publicly offered, the average price of a single share was ¥1.2 million ($7,120). That would make the total market value of the former PTT ¥18.673 trillion ($110.8 billion) with 300,000 employees and total assets over ¥10 trillion ($59.3 billion).

With its nominal privatization and the liberalization of the market on April 1, 1985, NTT was opened to competition from all sides. In the Type 1 telecom category, for companies with their own transmission networks, a number of "new common carriers" entered the fray. These included Japan Telecom, 36% owned by the then-national railway corporation; Teleway Japan, owned by Japan Highway Public Corp. and the Toyota group; Daini-Denden, owned by Kyocera, Sony, Mitsubishi, and others; and Tokyo Telecommunications Network, or TT Net, owned by Tokyo Electric Power, Mitsui, and Mitsubishi. Not needing to subsidize local phone service, these carriers could squeeze NTT by undercutting it on long distance rates.

NTT has responded aggressively. Since the liberalization, it has set up more than 70 new subsidiaries and affiliates, both to enter new business areas and to absorb some excess employees from its bloated work force. On the latter score, it has already managed to pare its payroll to around 300,000 from 314,000 in 1985. It is not just making work, though. NTT International (NTT-I), for example, a joint venture with 10 trading and three engineering companies of which NTT owns 53%, is charged with developing telecom services in the North American, European, Chinese, and Southeast Asian markets. DATAMATION estimates that NTT's dp revenues in 1986 were ¥195.6 billion ($1.16 billion), a 7.5% increase over 1985.

In conjunction with Teleport International of the U.S., NTT-I won an order for the design, construction, and maintenance of a teleport in Jamaica, which hopes to develop an offshore data entry industry for U.S. dp companies. NTT-I also began talks with Electronic Data Systems about a joint venture to provide data transmission services to U.S. companies in Japan and to Japanese companies overseas.

In late 1985, NTT reorganized its R&D bureau into nine telecommunications laboratories structured along market lines.

Revenue figures are in millions of dollars. Each increment represents $100 million.

31

GENERAL MOTORS CORP.

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Detroit, MI 48202
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General Motors was a corporate lemon last year, while Electronic Data Systems (EDS) was a veritable money machine. Even record sales of $102.8 billion couldn't stop GM's net income from dropping for the third straight year. This time it plunged 26.3%, to a lowly $2.9 billion, from the previous year's $3.9 billion.

EDS had record sales too, closing at $1.12 billion, a 15% improvement over 1985 and the first time that its non-GM revenue surpassed $1 billion. (Data processing revenues in the DATAMATION 100 do not include revenues stemming from sales by one unit of a company to another. GM contributed $3.25 billion to EDS's bottom line.)

Unlike its parent, EDS's revenue translated into record net income: $260.9 million, 37% above the previous year's all-time high of $189.9 million. Not too shabby for a corporation that lost its heart and soul.

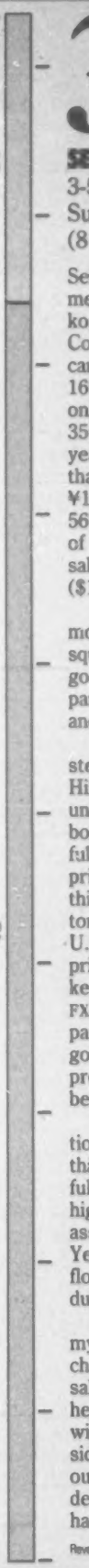
"Ross's [Perot] leaving was an emotional time period," says Les Alberthal, whom GM anointed EDS's president and ceo after Perot's involuntary and expensive departure. "We all grew up together. But we had to put it behind us, and I think by January we had.

"The same management team had been running EDS for a number of years. There wasn't any change in our direction, philosophy, or mission. And Ross's situation didn't have that big an effect either on our bottom-line performance or from a financial standpoint." No lie. EDS continued to rack up big federal contracts, among them deals with the Office of the Secretary of Defense, the Army Corps of Engineers, and the Department of Commerce.

EDS's consolidation of GM's computing facilities and major dp systems continued: there were 14 nationwide information centers at the end of 1986; when EDS started this job in 1984, it had five data centers and GM had 27. EDS and GM completed Dealerline, which automates and integrates every aspect of a GM dealer's operations. And EDS is 40% home in its five-year effort to rewrite, update, and integrate all General Motors Acceptance Corp. (GMAC) dp systems. The task will eventually yield a distributed network linking more than 11,000 GMAC terminals nationwide.

On the factory automation front, MAP (Manufacturing Automation Protocol), GM's pride and joy, took its lumps. A lack of adequate testing facilities made vendors reluctant to manufacture MAP version 2.1 products. Users were equally loath to commit time and money to installing version 2.1 when version 3.0, the last word in MAP, was visible on the horizon.

Revenue figures are in millions of dollars. Each increment represents $100 million.



32

SEIKO EPSON CORP.

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Seiko Epson was born on Nov. 1, 1985, of the merger between Seiko watch maker Suwa Seikosha Co. and its overgrown subsidiary, Epson Corp., of dot matrix printer fame. The union came just in time, as sales of watches plunged 16% in 1986 to $460 million (¥77.5 billion), or only 25% of overall revenues, as opposed to 35% of the two companies' combined total the year before. Printers and microcomputers more than made up the difference, increasing 35% to ¥174.5 billion ($1.04 billion) and accounting for 56% of the new company's sales, up from 49% of the previous year's combined figure. Total sales rose 18% in yen over 1985 to ¥310 billion ($1.84 billion).

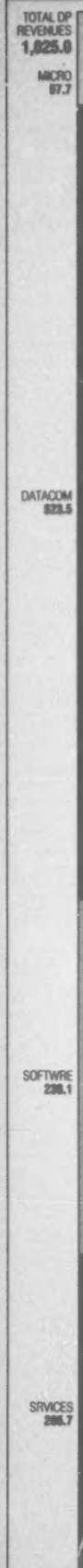
Because overseas sales account for more than 60% of revenues, profits are being squeezed by the rising yen. The company set a goal of doing one third of its production in Japan, one third in overseas consumer markets, and one third in low-cost production areas.

Last summer the company took a big step, opening a $10 million pc printer plant in Hillsboro, Ore. Initial production was 10,000 units per month with two printer and one circuit board assembly lines employing 110 workers; full production of 30,000 per month from five printer lines with 300 workers is scheduled for this year. Plans were also announced for a factory to be opened this year at Telford in the U.K., where Epson's sales of 15,000 dot matrix printers per month account for 46% of the market. It would start out making 8,000 midspeed FX-series printers per month, with eventual expansion to 20,000 per month. Added to the Oregon output, the goal of moving one third of production to overseas consumer markets has been met, at least for printers.

With the expensive yen, U.K. production is estimated to be 20% to 30% cheaper than in Japan. To reduce production costs, a fully automated printer assembly line, using highly accurate robots originally developed for assembling watches, was launched in Hirooka. Yet an automated line in Takaki for 3½-inch floppy disk drives stood idle for much of 1986 due to lack of market demand.

Seiko Epson remains something of a mystery since it is not listed on any stock exchange and does not give out much financial or sales information. It is part of the Seiko group headed by Hattori Seiko Co. Ltd., a trading firm with a number of manufacturing-oriented subsidiaries and affiliates. Seiko Epson's most serious problem may be Epson's history: it is so deeply rooted in dot matrix technology that it has fallen behind in developing laser printers.

Revenue figures are in millions of dollars. Each increment represents $100 million.



33

COMPAGNIE GÉNÉRALE D'ELECTRICITÉ

56 rue La Boetie
75008 Paris, France
(33-1) 45 63 14 14

Compagnie Générale d'Electricité's main objective in 1986 was to acquire ITT's telecom business, and thereby established itself as a world leader in public switching systems.

On Dec. 30, 1986, CGE signed an agreement with ITT to set up a joint company, Alcatel NV, based in Belgium, incorporating all of CGE's computer services, data communications, office automation, and private telephony activities, as well as both groups' public telecommunications interests. CGE has a 55.6% stake in Alcatel NV (21.5% directly and 34.1% through its French subsidiary, Alcatel).

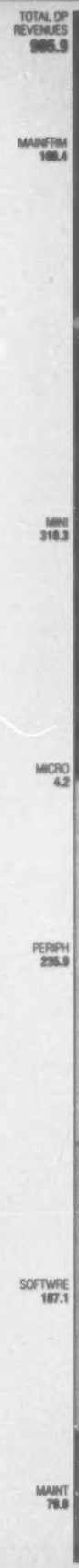
Shortly after this deal was sealed, the French government announced that CGE would return to the private sector by mid-1987, following five years as a state-owned corporation. As newly constituted, CGE is forecasting a jump in revenues to FF130 billion this year from FF80.9 billion in 1986.

All of CGE's dp and telecom interests were previously controlled by its major subsidiary, Groupe Alcatel. Leaving aside Alcatel's revenues from public switching systems, amounting to some FF13.9 billion ($2 billion) in 1986, the subsidiary's total revenues in dp and datacom equipment plus services amounted to FF7.1 billion ($1 billion) in 1986.

Alcatel reports that hardware revenues accounted for 55.9% or FF4 billion ($577 million) altogether, with sales of digital PBXs, videotex, and facsimile terminals by the private telephony division, Telic Alcatel, contributing FF3.2 billion ($461.8 million) of that. The public telecom division generated revenues of FF428 million ($61.8 million) from Datacom Systems, while the office systems division, SMH Alcatel, contributed FF400 million ($57.7 million) from the sale of workstations and micros.

Alcatel controls one of France's top five software and services firms, Générale de Service Informatique (GSI). Its revenues edged up 4.4% in 1986 to FF1.3 billion ($187.6 million). While GSI concentrates on developing managerial application software packages, Alcatel's other major services subsidiary, Société d'Études des Systèmes d'Automation (SESA), is one of the world's leading networking specialists. Its revenues climbed a healthy 21.3% to FF1.05 billion ($151.5 million) in 1986. New contracts include a major project for installing an on-line interbank clearing system. Alcatel has two other small software and service subsidaries: ITIN, which posted revenues of FF375 million ($54 million) in 1986; and Answare, which contributed FF350 million ($50 million).

Revenue figures are in millions of dollars. Each increment represents $100 million.



34

NIPPON UNIVAC KAISHA LTD.

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Tokyo 107, Japan
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Nippon Univac Kaisha Ltd. (NUK) was one of the few Japanese dp companies in 1986 for which prevailing trends in currency and international trade relations were favorable. A strengthening yen meant that the U.S.-made Sperry 1100 series mainframes that form the top of NUK's product line were cheaper to import, while the government's action on Jan. 20, 1986, to remove the last import tariffs of 4.9% on cpus, 6% on peripherals, and 4.9% on parts had a like effect. Added to the fact that the company has no export sales to be hurt by the strong yen, the result was respectable sales growth of 10% to ¥166 billion ($986 million). Consolidated profits were up only 3%, down from an impressive 17% jump the year before.

Orders of 1190 series mainframes were up 15% over the previous year, with 40 new orders in the second half of the year at prices ranging from ¥200 million ($1.2 million) to ¥1 billion ($5.9 million).

NUK reinforced its strength in the financial and trading industries last summer with the introduction of a "global trading system" software product tailored to the needs of Japanese financial firms setting up branch offices in the major world financial centers. Yamaichi Securities ordered another 1194 for its system in the fall, and NUK has targeted other leading firms for a big sales push. Other notable sales were of an 1192 to All Nippon Airlines and an 1190 to Toa Domestic Airlines, both of which are now expanding their networks.

The midsize Chaparral, oem'd by Oki Univac, was enhanced with CMOS circuits and made more compact; it was renamed the Swift 2200/200 series. NUK introduced a revision of the MAPPER general purpose, fourth generation software product to make "programming for the programless" easier, and Unidraft, an electronic drawing system for manufacturers.

The biggest event affecting NUK was the Burroughs-Sperry merger. Company officials claim that the merger affected them only in that they were spending a lot of extra time reassuring their customers that there would be no changes in their relationships. In the end, say the officials, most customers were positive about the merger, figuring the increased R&D power of the new company would be beneficial.

NUK and the Unisys subsidiary in Japan intend to remain separate entities, mostly because Nippon Univac operated with considerable independence from Sperry. The company is 60% Japanese owned; Unisys and Mitsui are the big holders at 34.2% each, while Oki Electric and Mitsubishi Electric each have 2.5%.

Revenue figures are in millions of dollars. Each increment represents $100 million.

35

COMPUTER SCIENCES CORP.

2100 E. Grand Ave.
El Segundo, CA 90245
(213) 615-0311

Venerable Computer Sciences Corp. went on a buying spree in 1986 to bolster its sales in commercial markets.

These efforts, plus some megacontracts in its bread-and-butter federal government market, boosted the 28-year-old computer services company's revenues by 22% in 1986 to $977.7 million, from $800.7 million in 1985.

The acquisitive momentum started building early in the year when CSC bought Comtec Inc., Farmington Hills, Mich., a services provider to health maintenance organizations. In April, the company committed $235 million to a five-year acquisition program to increase commercial sales. Then it bought up credit bureaus in Iowa, Minnesota, Illinois, and Indiana to bring to 29 the number of credit-reporting operations owned by its Houston-based subsidiary Associated Credit Services. In July, the company bought a $20 million-a-year professional services firm, Computer Partners Inc. of Waltham, Mass.

In a report on the quarter ended Sept. 26, 1986, chairman and president William R. Hoover said commercial markets accounted for the strongest revenue and profit gains: for the quarter ended Dec. 26, commercial markets' revenues increased 50%, compared with 19% for the federal government market.

The company's number one market was hardly lackluster, however. In 1986, CSC bagged five big ones—government contracts in the $100 million to $282 million range. This year promises even more. In March, CSC nailed its biggest contract ever, a 10-year contract from NASA for $1 billion, which is expected to augment annual revenues by $20 million.

This would be a big boost for net income, which, in calendar 1986, was $30.3 million, up from $22.3 million in 1985. Corporate assets at the end of the year totaled $588.4 million, up from $463.6 million a year earlier.

CSC's activities are organized in three groups: Systems Group, with primary markets of government agencies and military services; Industry Services Group, with primary markets being credit grantors, tax preparers, and insurance and health care organizations; and Information Network Services Group, mainly multinational and multilocation operations both in business and government. Systems continues to be the strongest but the other two are pulling up.

CSC derived 91% of its '86 revenues from the United States; 2% from the United Kingdom, and 1% each from West Germany, Canada, and the Netherlands.

Revenue figures are in millions of dollars. Each increment represents $100 million.

36

AMDAHL CORP.

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Amdahl Corp. finally got most of its pieces moving in the right direction in 1986, and, by the end of the year, the maker of IBM-compatible mainframe computers had what you might call momentum. For the year, the company came close to joining the billion-dollar club, with $966.6 million in revenues and $41.8 million in earnings. Earnings were 46% better than 1985 earnings of $28.7 million, and revenues were up 12% from 1985's $862 million.

But it was what Amdahl did in the fourth quarter of 1986 that turned some heads. For that period alone, Amdahl had sales of $337 million and earnings of $27 million, both of which were records. That's not to mention a gross profit margin of 43.2%.

The secret was this: Amdahl started shipping its new model 5890 mainframe computers on time. And the systems performed an average of 10% better than advertised, giving Amdahl a significant price/performance advantage over IBM in the later months of 1986. Although IBM has taken steps to narrow that gap in early 1987, Amdahl had already shipped more than 60 new 5890s by the end of 1986, out of a total of about 200 systems sent out last year. Many of those 5890 systems were shipped with Amdahl's unique Multiple Domain Facility, a software feature that allows users to partition a single processor and run more than one set of systems software simultaneously.

Amdahl's ability to ship the 5890 as promised differed from the company's experience in 1985 with the late and problem plagued predecessor 580 product line. Also contributing to the strong showing was Amdahl's large-scale disk storage product line. The second half of 1986 saw Amdahl begin shipping a new double-capacity 3380-class storage device made by Fujitsu. Altogether for 1986, Amdahl shipped about 500 of the double-capacity 6380E devices and over 5,000 drives and controllers total, accounting for about $198 million in revenue.

In the storage and mainframe businesses, Amdahl was aided last year by a general easing of market pricing pressure. When market leader IBM moderated its practice of cutting mainframe prices an average of 20% per year, Amdahl's profit margins hit a two-year peak.

Going into 1987, analysts were predicting continued success for Amdahl. Early in the year, the company was able to boost memory performance on its 5890 line to keep pace with IBM performance enhancements. And the company said it was on schedule to ship its high-end, 70MIPS 5890 model 600 mainframe in the fourth quarter of the year.

Revenue figures are in millions of dollars. Each increment represents $100 million.

37

RICOH CO. LTD.

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Ricoh is the leading Japanese maker of copiers: it made over 40% of the installed machines in Japan. Although its export ratio at 31% is far lower than the 75% or more of some of its competitors—like Canon—the expensive yen still hurt: revenues grew only 1.6% to ¥591 billion ($3.5 billion), while profits fell 28% to ¥11.4 billion ($67.4 million). A recent increased emphasis on dp products continued to show results, but the 4.1% sales jump to ¥157.4 billion ($934 million) wasn't nearly as impressive as that of 1985, and dp still accounted for only 26.6% of revenues.

A continued emphasis on increasing dp sales is most likely. Sales of plain paper copiers, the company's cash cow, started moving up during the first part of the year, but then dropped back, and by year-end were off about 4%, accounting for a lower than usual 48% of total domestic sales. The rising yen wasn't a complete disaster, though: Ricoh's export ratio for plain paper copiers is 34%, far lower than the industry average of 80%.

Overseas production of facsimiles began last autumn. Two models of GIII fax machines are being made in the U.K., with a production level of 5,000 per month projected for this year. Facsimile machines turned in the worst performance in the dp category, off 2.6% to ¥59.3 billion ($352 million). The strong growth in this industry has in recent years attracted all the major integrated electronics manufacturers, resulting in downward price pressures and a move to low-end machines. With the total Japanese market down around 3%, Ricoh's performance was slightly better than average. The fax export ratio is at 40%, a bit higher than the overall company average because of an oem tie-up with AT&T. In early 1986, overseas sales fell after an inventory adjustment in the U.S. market, and growth in the segment didn't recover to healthy levels by year's end.

Except for facsimiles, dp revenues were up. Sales of dot matrix printers declined through much of the year, but laser models made up the difference, thanks to an oem contract with Digital Equipment Corp. In October, laser printer production was more than doubled, to over 10,000 per month, resulting in an increase in printer sales of 25% for the year.

Ricoh has not suffered as much as some other Japanese companies from the semiconductor slump, as it specializes in custom and semicustom large-scale integration chips rather than commodity memory chips. Sales were up around 25% to about ¥20 billion ($119 million), and contributed to profits again.

Revenue figures are in millions of dollars. Each increment represents $100 million.

38*

NORTHERN TELECOM LTD.

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It was a year of consolidation for Canada's Northern Telecom. No major new products were introduced, and there was an emphasis on increasing capital. The company continues to hold a lead position in the worldwide digital telecommunications systems market, neck and neck with AT&T.

DATAMATION estimates that NT's total dp revenues remained flat in 1986 at about $900 million, reflecting the mature state of the PBX market. Total company revenues were up a pallid 3% to $4.38 billion, while earnings rose 5% to $287 million (NT reports in U.S. dollars). Sales in the first half of '86 were slow, reflecting price reductions and software problems with its switching equipment. By the fourth quarter of '86, after newly hired engineers had rectified the software problem, sales of the equipment rose sharply, and at year's end, feeling flush, the company bought back some of its common shares and announced a stock split.

While AT&T and IBM/Rolm use direct sales forces to hawk their PBXs, NT increasingly relies on other companies. Last year, the sales and service operations of NT's Integrated Office Systems Division in the West and Midwest were sold to subsidiaries of Pacific Telesis and Centel Business Systems. NT, 52% owned by Bell Canada Enterprises, now operates a direct U.S. sales force only in the Northeast.

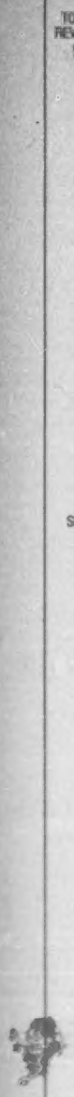
Northern Telecom took measures to bolster its performance in the office automation field, forming two strategic alliances in the area. In September '86, together with Apple Computer Inc., NT unveiled some networking capabilities linking Macintosh computers to other manufacturers' computers through the Meridian SL-1 Integrated Services Networks. More jointly developed products can be expected in the future. NT's ties with Hewlett-Packard were strengthened with the introduction of a combined interface/line card, which eliminates data modules between an HP 3000 host computer and the Meridian SL-1.

NT made the first simultaneous voice/data call in the U.S. using an actual user application that met ISDN standards. It was done over an NT DMS-100 node in the public telecom network, using NT's Meridian digital telephones and a Meridian M6000 workstation.

In England, Northern Telecom plc was restructured by combining the U.K. Communications Systems and Data Systems divisions and creating Northern Telecom Europe, which now encompasses operations in Europe, the Middle East, and Africa.

*Northern Telecom and GE were tied for 38th place.

Revenue figures are in millions of dollars. Each increment represents $100 million.



38*

GENERAL ELECTRIC CO.

3135 Easton Tpke.
Fairfield, CT 06431
(203) 373-2211

GE continued its meteoric financial ascent, reaping record revenues and earnings. Helped by the June completion of its acquisition of RCA, corporate revenues increased an impressive 26%, to $36.7 billion from $29.3 billion in 1985. Income rose 9% to $2.5 billion from $2.3 billion. But success was not enjoyed in all the company's divisions. Although GE does not provide financial details for individual business segments, DATAMATION estimates that sales for dp operations tumbled to $900 million, a 20% decrease from the previous year's $1.13 billion. The news was even bleaker for the major component of that segment, GE Information Services, (previously known as GEISCO). After revenues had risen 15% to an all-time high of $950 million in 1985, the bottom fell out. GE Information Services sales closed at $550 million in 1986, a 42% decrease. The remainder of the dp revenue was split between Calma, the company's CAD arm, which pulled in $180 million, and GE's and RCA's third-party maintenance contracts, accounting for $170 million.

So what went wrong? Well, life got tougher in the private network fast lane. There was more competition, particularly in electronic data interchange, the pride and joy of GE Information Services. The company committed considerable resources to the sector, including new joint marketing agreements and strategic rethinking of the markets to which the company will commit its resources.

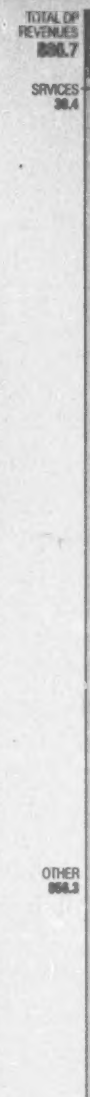
Amidst this, GE Information Services president Walter Williams was kicked upstairs to be senior vp for corporate marketing and sales at GE. The new boss is Anthony Craig, who had been GE Information Services' senior vp of international sales and operations.

GE Information Services had been going international prior to Craig's ascendancy, as indicated by last July's establishment of a software development center in Ireland. Craig accentuated the movement when he signed a joint venture in January 1987 with ICL and a cooperative marketing agreement in March 1987 with Racal-Guardata of the U.K. The ICL combo, International Network Services Ltd., will provide electronic data interchange to companies in the U.K. The Racal-Guardata deal, based on GE Information Services' Money Transfer System, offers new capabilities to prevent technology-based crime in electronic funds transfer.

The company also announced async-to-3270 conversion service and a new pricing structure for MARK*NET, its VAN service offering, and access to Dow Jones News/Retrieval.

*Northern Telecom and GE were tied for 38th place.

Revenue figures are in millions of dollars. Each increment represents $100 million.



40

COMDISCO INC.

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Rosemont, IL 60018
(312) 698-3000

Despite tax rulings that raised Comdisco's costs in its core business of leasing and reselling computers—costs that have continued to rise under tax reform—the Rosemont, Ill.-based firm posted record revenues and operating income for the second straight year.

Total revenues for 1986 were $901.6 million, an increase of 36% from 1985. By comparison, 1985's revenues were up 8% from the previous year. Operating income for 1986 rose 37% over 1985's level, to $79 million. Last year's total income included no extraordinary gains and was slightly off from 1985's $87.5 million, which was boosted by an extraordinary gain of $30 million.

Two thirds of Comdisco's 1986 revenues came from the computer leasing market, in which the company claims roughly a 20% share. Computer sales represent the second major source of Comdisco's revenues. While the company has been expanding both its leasing and sales efforts to include non-IBM equipment, the bulk of Comdisco's customers continue to be Big Blue users. Comdisco is today the largest independent IBM computer leasing company and the largest IBM computer dealer in the world.

The firm has been dogged with tax difficulties since 1984, when the IRS began a broad review of certain tax shelter transactions that benefited Comdisco's investors and customers. The company subsequently discontinued the disputed deals. In 1986, Comdisco won a favorable ruling for audit years 1980, 1981, and 1982, and paid $6.2 million instead of the more than $200 million the IRS originally sought.

But the tax man's next bite turned out to be much bigger. Early this year, Comdisco paid $65.1 million to resolve an audit for fiscal 1983 and 1984. The company said it had established adequate reserves to cover the payments and that the settlement won't affect earnings.

Meanwhile, Comdisco's ventures in noncomputer capital equipment financing, risk arbitrage, and oil and gas exploration have yet to yield stable returns. The company's fledgling disaster recovery services business got a lift when it helped a Montreal retailer quickly resume normal dp operations after a fire last October, a recovery that received widespread note in the industry. The subsidiary ended last year with over 600 subscribers, the tops in the field.

Some observers see the new tax law creating new problems for Comdisco, but the company actually views it as a plus, claiming it squeezes competitors that had stressed tax benefits over technical expertise and service.

Revenue figures are in millions of dollars. Each increment represents $100 million.

41

ITT CORP.

320 Park Ave.
New York, NY 10022
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At the end of 1986, the New York-based conglomerate closed a deal with France's state-owned Compagnie Générale d'Electricité under which ITT sold its worldwide telecommunications operations and related high-tech businesses to a new joint venture named Alcatel NV. While ITT retains a 37% interest in Alcatel NV, the venture is being managed by CGE. Among the $1.25 billion worth of companies ITT sold was the Business Systems Group, representing virtually all of ITT's U.S.-based dp vendors. ITT's final year as a major dp vendor wasn't bad: 1986 revenues for the Business Systems Group grew 16% to $880 million.

ITT's withdrawal from dp closes a history dotted with reorganizations, cutbacks, and few clear successes, particularly in the U.S. Philippe Gluntz, Alcatel NV's chief operating officer, recently stated that the U.S. office automation business it bought from ITT isn't profitable. At the time of the sale, the Business Systems Group included five companies: printer manufacturer Qume Corp.; ITT Information Systems, supplier of the Xtra line of IBM PC-compatible micros; terminal and controller maker ITT Courier; third-party maintenance firm Servcom; and ITT Business & Consumer Communications, a maker of central office telephone switches.

Dp revenues were never vital to ITT, which took in $23.5 billion in sales last year, up 19% from $19.6 billion in 1985. Less than 4% of 1986's revenues were garnered by the U.S. dp companies sold to Alcatel NV. But the rest of the companies spun off in the deal, mostly Europe-based telecom businesses, accounted for 22% of ITT's sales last year.

Since 1979, ITT—formerly International Telephone and Telegraph Corp.—has sold more than half of the 200 businesses it once held. It is now mainly involved in insurance, hotels, financial services, automotive products, electronic components, defense, and industrial technology.

Upon its formation, Alcatel NV, which is currently headquartered in Brussels, Belgium, became the world's second-largest telecom company, after AT&T, with annual sales expected to be roughly $12 billion.

In Europe, the Office 2000 line of voice/data office products will probably benefit from the merging of CGE and ITT telecom customers, but competing in the U.S. will remain difficult. ITT Information Systems, now called Xtra Business Systems, is the pc supplier for the Office 2000 line; it added two high-end micros to its domestic Xtra line last year but still claims just 1% of the U.S. pc market.

Revenue figures are in millions of dollars. Each increment represents $100 million.

42

OKI ELECTRIC INDUSTRY CO. LTD.

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Minato-ku, Tokyo 105, Japan
(81-3) 501-3111

It's hard to find any dp industry observers in Tokyo who are optimistic about Oki. The company lost around ¥2.5 billion ($14.8 million) in 1986, with total revenues down 5.8% and dp sales off 30% to an estimated ¥148.2 billion, ($880 million). Losses are expected to continue. Oki's problems go deeper than the general woes affecting the Japanese dp industry. Not only did the company suffer from the appreciating yen and sagging semiconductor and pc-related markets, but it also seems to have positioned itself to bear the brunt of these unfavorable developments. Some analysts say the problem is poor management and they doubt whether Oki will survive without outside help.

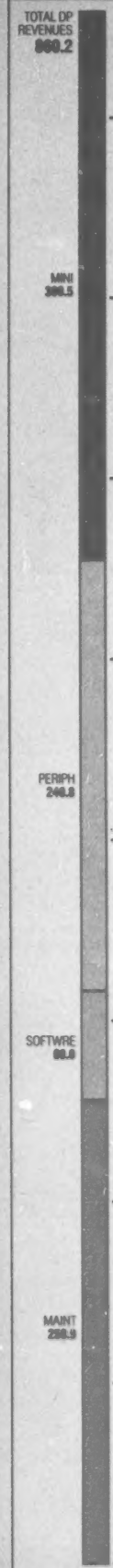
Oki's weakness is the result of an obvious, if unstated, management belief that merely being a Japanese company was one of the most important elements of success. More specifically, it has depended far too heavily on those structural factors that for a long time have given Japanese manufacturers an almost insurmountable edge over their foreign competition. One such factor was the undervalued yen, which permitted the large overseas sales of commodity products that are so necessary for the kind of high-volume, low-cost manufacturing upon which many Japanese companies depend. This was especially important for Oki. Almost 40% of its 1985 sales came from peripherals—those most typical of Japanese commodity export products—especially printers. In semiconductors, 15% of sales, its bread-and-butter item is the 256KB DRAM. At one point in 1986, it was producing some 3 million of these chips per month, the subject of some of the fiercest price-cutting around.

When the yen rose, mere volume lost its magic. Oki's export ratio dropped to 22% in 1986 from 29% in 1985, due, in large part, to lower peripherals sales, which DATAMATION estimates were down 40%. Semiconductor output was also down.

Production of the 256KB DRAMS, for example, was said to have dropped to just 1 million per month, which may have set the stage for Oki's alleged chip dumping that led to trade sanctions this spring.

Domestically, Oki may also have set itself up for a fall. Nearly 20% of its dp business comes from telecom equipment. It depends heavily on NTT, however, relying on it for 16% of total sales. In the past, this would have been an almost certain guarantee of years of profits. Now that NTT is a profit-making entity, however, it is getting tougher with suppliers, even introducing competitive bidding in some cases.

Revenue figures are in millions of dollars. Each increment represents $100 million.



43

PRIME COMPUTER INC.

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Natick, MA 01760
(617) 655-8000

The key theme of Prime's calendar year was the sacrifice of profitability in order to fuel growth. The 15-year-old company's mission of reaching a critical mass of $2 billion by 1990 called for a "minimum" of 20% growth in 1986. Although the mini maker continued to outgrow the industry—boosting sales a respectable 12%, to $860.2 million—its gain in market share cost plenty. Prime's net income dipped 19%, to $46.9 million. Non-U.S. sales grew a healthy 13% to contribute 42% of all revenues for the year. Business in Europe (about a third of total worldwide revenues) was still strong.

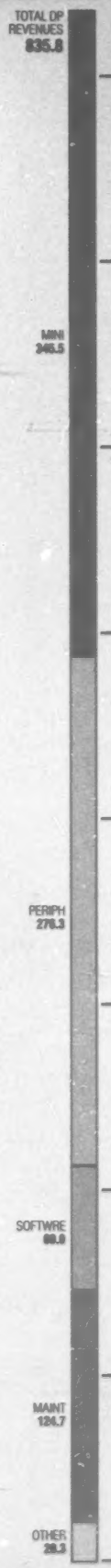
A major disappointment was the CAD/CAM and workstations group. Total sales for the group grew only 10% (compared with 33% the year before), and management announced a restructuring of this pivotal operation. Andrew Knowles, the former president and chief executive officer, was promoted to chairman and given broader planning responsibilities. In as the new ceo and director of the group's daily operations is Robert A. Fischer, a 25-year industry veteran and former chairman of McDonnell Douglas's Information Systems Group. Fischer is expected to spearhead a push into the potentially lucrative computer integrated manufacturing sector.

Despite missing its revenue targets, Prime maintained R&D spending at its 1985 level of 10% to 11%, and continued to invest heavily in new strategic product areas. Future development efforts, insiders reveal, aim at combining the strengths of Prime's proprietary Primos operating system and the more generic Unix. The company entered into alliances with two Mountain View, Calif., startups, MIPS Computer and Silicon Graphics, to build a new high-performance graphics workstation for its CAD/CAM customers. A joint venture with startup Cydrome, Milpitas, Calif., will result in a minisupercomputer for modeling and simulation applications later this year.

Prime took a minority stake in Cydrome and further alliances and acquisitions are being planned; the company doesn't believe it can meet its $2 billion growth target by internal growth alone, and has declined to create its own vertically integrated family of products.

In 1986, Prime finally replaced its five-year-old 2250 with two new low-end office computers, the 2350 and 2450. Also new was a Model II extension to the top-of-the-line 9955 and a replacement for the high-end 9750, the 9755. Both new superminis offered 50% more performance than the computer room systems they replaced, the company claims.

Revenue figures are in millions of dollars. Each increment represents $100 million.



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TANDEM COMPUTERS INC.

19333 Vallco Pkwy.
Cupertino, CA 95014
(408) 725-6000

While many of its rivals languished in the continuing industry doldrums, Tandem in 1986 took advantage of hot new products and continued strong growth in a number of important on-line transaction processing markets to return to something approaching the fast-paced growth rate of its earlier years.

Tandem's profits in calendar 1986 jumped by 148% compared with 1985 levels, climbing to $79.2 million from $31.9 million. Revenues were up 32%, to $835.8 million, with the fourth quarter leading the way.

Tandem president and chief executive James G. Treybig attributes his company's growth to continuing strong international demand and the worldwide increase in the kind of on-line applications that can take advantage of Tandem's fault tolerant NonStop architecture. Also helping was the introduction and shipment of some key new products, including the high-end, gate array-based NonStop VLX and the entry-level NonStop EXT. Sales were brisk for Tandem's new Multilan hardware and software products which allow Tandem systems to communicate along any LAN that supports IBM's Netbios protocols. New products accounted for 75% of Tandem's sales in 1986.

The surge in on-line applications and its new products allowed Tandem to pick up some new "prestige" users in 1986, and the company held its own against challenges in the OLTP market from NCR and Stratus Corp., Marlboro, Mass. For example, Texaco Oil AT in Sweden decided to implement a new point-of-sale application in Sweden, Norway, and Denmark on Tandem systems, and GTE Corp. ordered $40 million worth of Tandem gear for a telephone equipment management system. Tandem also landed a job with the U.S. Air Force Logistics Command.

Tandem's organizational structure went through some changes in 1986. First, the company set up a new Alliance program to encourage development of third-party applications on Tandem hardware, in the process increasing the number of applications running on its systems by over three times, to more than 225 programs. Tandem also set up a "new ventures" office to create joint venture relationships with outside companies. Among the deals signed so far are ones with PacBell of San Francisco and the Volmac Group of the Netherlands.

As 1986 ended, Tandem laid plans to repeat its new product successes, introducing an SQL-based distributed DBMS and adding low-end Unix- and CMOS-based offerings to fend off pressure from IBM, NCR, and others.

Revenue figures are in millions of dollars. Each increment represents $100 million.

45

C. ITOH & CO. LTD.

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C. Itoh, one of the top three Japanese trading companies, is considered the most vigorous of all of them. Fortunately, it hasn't relied too much on dp sales—about 1% of total revenues—to prop up the bottom line. Dp was down 19% in 1986 to ¥136.3 billion ($809 million). Overall revenues were down 4.6% to just over ¥14.8 trillion ($88 billion). C. Itoh is weathering the escalating yen better than most Japanese companies, since almost 45% of its transactions are purely domestic, and about 17% involve imports of such items as oil, forest products, metal ores, and foodstuffs, for which costs have dropped sharply. Around 20% of transactions are offshore, leaving exports accounting for only 18.6% of revenues.

In dp products it's a different story, though. The biggest money-maker in the category is peripherals. Most of these products are manufactured by companies like Tokyo Electric to C. Itoh's specifications; the company commits to buy a certain amount, and partially finances the purchase of production machinery. The problem is that a full 80% of the peripherals is exported. The company estimates it has almost 8% of the U.S. printer market, for example, and it also does well in monitors, floppy disk drives, and terminals. U.S. peripherals sales were off 50% or more in 1986 due to the weakness of the dollar against the yen, while domestic sales were flat. Although the company is trying to shift some sales to Europe, results so far have not been encouraging.

The rest of the dp picture was not quite so bad. Dp products are actually produced by two divisions of Machinery Group No. 3, the electronics division and the aerospace and electronics division. The group itself isn't doing badly: 1986 sales were $4.2 billion (¥700 billion), up about 14%. Its response to poor dp sales has been to "have a lot of meetings" to figure out how to shuffle personnel into the more promising sections. One such area will be facsimile machines. The company expects fax sales to double in 1987, in light of a booming U.S. market. Sales are less sensitive to the exchange rate because 90% to 93% of all faxes are made by Japanese manufacturers, all of whom must cope with the same yen rates.

In May, the company signed some notable import pacts, agreeing to market through C. Itoh Data Systems the fault tolerant systems of Stratus Computer, and the minisupercomputers of Culler Scientific Systems. No machines of either type were sold in 1986. It also signed an agreement to market Texas Instruments' Explorer AI workstation through CRC.

Revenue figures are in millions of dollars. Each increment represents $100 million.

46

COMMODORE INTERNATIONAL LTD.

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After five quarterly losses totaling $274 million, Commodore edged back into the black during 1986. Cost-cutting, including a one-third reduction in payroll, the closing of three plants, and heavy write-downs of inventory accounted for the return to profitability. Company officials and analysts have been optimistic, saying Commodore is now in the midst of a turnaround. But the future is still far from assured.

The company's many difficulties include tough competition in the marketplace; pricing pressures; the slow recovery of the pc market; the company's own debt problems; and chaos in the executive suite.

Profitability came midyear, when the company posted $1.2 million in earnings in its fiscal year fourth quarter ending June 30. (The company had a loss of $124 million in the corresponding quarter a year earlier.) Commodore showed a loss of $10 million for the calendar year, compared with a loss of $237.2 million in 1985. Revenues were up to $837.7 million compared with $798.6 million in 1985. During its period of heavy losses, Commodore took inventory write-downs of $93 million and factory closing charges of $22 million.

Bankruptcy rumors, rampant in 1985, continued in 1986, although they were muted somewhat when the company renegotiated a $135 million loan agreement with its lenders.

The company has been a leader in the low-priced personal computer market and is trying to build a new, higher-priced business based on the Amiga computer, which it introduced last year.

Although praised for its technology, sales of the machine have been slow because of a sluggish market and lack of software. Commodore officials assert that sales have picked up, and that another, enhanced version of the machine will soon appear.

Overseas sales of Commodore's IBM PC-compatible models were a major contributor to profits. Sales of the company's low-end Commodore 64 and 128 were flat. Meanwhile, the company rolled out a few new products early this year, including two low-cost XT compatibles and a sleeker version of the Commodore 128.

Thomas J. Rattigan, named chief operating officer in March 1986, did much to cut costs and improve business, but his tenure lasted little more than a year. In April, he and several other executives were ousted. Rattigan filed a $9 million damage suit against the company, and is said to have a five-year contract that guarantees him $3.6 million.

Revenue figures are in millions of dollars. Each increment represents $100 million.

47

TEXAS INSTRUMENTS INC.

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Cutting and slashing, Texas Instruments put its digital products group—and the company as a whole—back in the black in 1986 and still had enough energy left over to introduce a new line of midrange computers for the multiuser market.

Things had already begun to change at TI in 1985. With losses mounting each quarter, the company cut more than 8,000 jobs from the payroll, shutting down excess production capacity, and changing management. Jerry R. Junkins, an electrical engineer who had been with the company for years, took over as president and chief executive officer from J. Fred Bucy, who took early retirement. In 1986, it all came together. While sales remained flat at $4.97 billion, the company earned a profit of $102 million.

The biggest increases in both sales volume and earnings came in the defense electronics business, which showed a profit of $210 million on sales of $1.72 billion. Sales of semiconductors, which now account for just over 40% of revenues, remained flat but profitable, a result of the massive reductions in production costs.

The biggest turnaround came in the digital systems group, which sells computers and peripheral products as well as calculators and industrial control systems. While sales actually fell 7% to $931, the company turned a profit of $28 million. DATAMATION estimates that sales of TI's computers and peripheral products remained the same at about $750 million.

The new computers introduced in 1986, the TI System 1000 series, operate in the Unix environment. That's a real departure for TI, which in the past has offered only systems that run a proprietary operating system. The high-end System 1500, which can handle from 32 to 125 users, was introduced in the spring of 1986 and has since been followed by the smaller Systems 1100 and 1300, which can handle from two to 32 users. TI is selling through a network of vars targeted at the health care, automotive, and banking markets.

Because some of the worst mishaps in the company's history—digital watches, home computers—originated in the digital products group, any new product thrust is viewed with some trepidation. But instead of trying to make a splash in broad markets with high revenue potential, TI now focuses on well-defined markets in search of profitability. Analysts have praised the new strategy, while noting that the market for midrange, multiuser computers is not lacking for competitors.

Revenue figures are in millions of dollars. Each increment represents $100 million.

48

TELEX CORP.

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Telex has thrived in the tortuous 3270 terminal market. Unfortunately, in 1986 IBM went on the warpath: although sales of all of Telex's computer products were up 22% in 1986, sales of terminals and controllers were up less than 10%. Net income, which grew by over 40% in each of the last two years, was up only 9% to $72.8 million.

Price-cutting of about 10% a year is common in the 3270 terminal market, but IBM isn't sticking to that rule anymore. IBM slashed prices on its existing product line and introduced its new 3191 terminal at $1,200, about 28% below previous models. Big users who bought in bulk got a considerable discount off the list price.

All this price-cutting is taking place in a maturing market. Sales of 3270-compatible terminals grew 11% in 1986, but the dollar volume slipped to $1.42 billion from $1.48 billion. While IBM has some 58% of the market, Telex is in second place with 16%. The other major competitors are ITT Courier, AT&T Teletype, Memorex, Lee Data, and Harris.

Telex counterattacked with its own 3191 terminal. It also came out with a new series of airline reservation terminals, a voice data terminal, and a series of terminals and printers for IBM Systems/36 and 38, its first appearance in that market.

Telex management was optimistic that the Telexecom PBX division, acquired at the beginning of '86, would become profitable right away and make a substantial contribution to earnings and revenue. Telex is eager to establish itself as a company that knows how to merge voice and data communications. But integrating the PBX operations proved tougher than expected, and revenues of $34 million in 1986 were considerably below expectations.

Telex continued to invest heavily in automated facilities. The Telex 3191—like its IBM counterpart—is built in an automated factory in Raleigh, N.C. The company's new automated distribution and repair facility in Tulsa also began operation in 1986. In addition, Telex continues to invest heavily in new products. R&D earmarked for new computer products was up 30% to $40 million.

Telex's primary strategy for dealing with the price-cutting and maturation in the 3270 terminal market is to target niches. That's why it acquired its PBX division from United Technologies in 1986 and its airline reservation business from Raytheon in 1984. In 1986, Telex also sold $21 million worth of its new IBM-compatible pcs.

Revenue figures are in millions of dollars. Each increment represents $100 million.

49

NATIONAL SEMICONDUCTOR CORP.

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Continuing strength in National Semiconductor Corp.'s National Advanced Systems (NAS) plug-compatible mainframe business could not counterbalance a slump in the merchant semiconductor business.

Bottom line result: losses of $53.6 million on sales of $1.68 billion. Most of National's loss came as the company's main chip product line, bipolar circuits, felt increased competition from low-priced Japanese parts. National's 1986 sales were up only 4% from 1985's $1.61 billion.

NAS, which resells IBM-compatible mainframes and disk and tape drives manufactured by Hitachi Ltd., was profitable with the help of a new generation of Hitachi hardware and the lack of significant new product or pricing pressures from IBM. Revenues in 1986 of NAS and another subsidiary, Datachecker, a manufacturer of point-of-sale terminals, were up 11% over 1985 to $725 million.

NAS in 1986 made a successful transition to the AS/XL mainframe line. Based on high-density, high-speed Hitachi emitter-coupled logic, the air-cooled, six-model AS/XL family promised performance at least equal to that of the IBM 3090 mainframe line—often with cost, space, and energy savings.

The dual-processor AS/XL 50, 60, 70, and 80, competing with IBM's 3090 Models 180 through 300, began shipping worldwide in July. By the end of the year, NAS had shipped over 40 AS/XL mainframes.

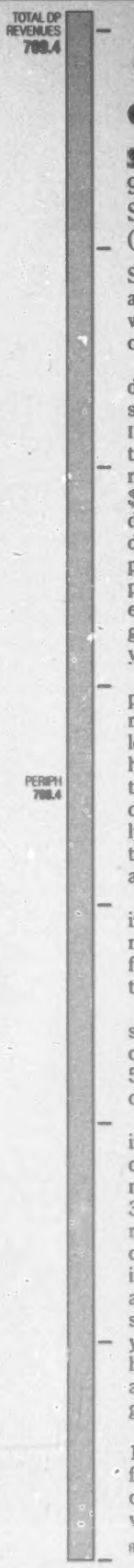
Following IBM's January 1987 move to improve 3090 price/performance, NAS added to the performance of the AS/XL line by introducing faster, denser memory technology. NAS also promised to accelerate initial shipment of the three- and four-processor versions of the AS/XL and leapfrogged IBM by adding a 6MBps channel capability to the mainframe.

Following a January lag in orders related to the IBM performance boost announcement, NAS said AS/XL demand had returned to normal.

NAS scored in the pcm large-scale DASD market: its Hitachi-built 7380 Model E was one of the first double-capacity disk storage devices shipped by a vendor other than IBM. By the end of 1986, analysts estimated NAS's share of the huge 3380-class disk market at 6%.

National Semi's president and chief executive Charles Sporck has predicted "continued modest improvement" in the company's semiconductor business in 1987 and continued strong growth in the pcm computer business. But NAS faces a wave of user fear and uncertainty as the threat of a trade war with Japan grows.

Revenue figures are in millions of dollars. Each increment represents $100 million.



50

SEAGATE TECHNOLOGY

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Seagate Technology in 1986 made Wall Street and its investors forget all about 1984 and 1985 when prices were down and profits were slim or nonexistent.

In 1986, the maker of small rigid disk drives for personal computers reestablished itself as the number one drive supplier for the IBM PC and significantly increased its sales through value-added resellers and dealers. As a result, Seagate's sales more than doubled, to $709.4 million. At the same time, Seagate drove down costs by continuing to increase offshore drive manufacturing, and reported a record profit of $90.4 million, a stunning figure compared with its 1985 profit of $8.7 million. By the end of 1986, Seagate had managed to achieve a gross profit margin of 29.5%, its best in four years.

Even Seagate officials have been surprised by the dramatic turnaround at the company, which in 1985 produced an actual operating loss of $12 million, before tax benefits. "If we had been asked a year ago how large we'd be today, we would never have dreamed we'd be operating at $1 billion a year in sales this quickly," said Seagate treasurer David Drennan after the company's December quarter results were announced.

A big reason for the surge was Seagate's increased value-added reseller and dealer business. In 1985, resellers and dealers accounted for about 5% of Seagate's sales. By mid-1986, that portion had increased to about 55%.

IBM continues to account for the greatest share of Seagate's business, though. At the end of 1986, sales to IBM, primarily of Seagate's 5¼-inch drives, accounted for about 30% of the company's sales.

If IBM's new PC announcements are any indication, however, Seagate may soon see a decline in its business with Big Blue. All the new IBM Personal System/2 designs include 3½-inch rigid disk drives, most of which IBM is making itself or purchasing from oem vendors other than Seagate. Seagate did not announce its own 3½-inch drives until early in 1987, and analysts don't expect sales of those drives to show up on the Seagate sales line until mid-year. Meanwhile, the company continues to enhance its 5¼-inch drive line, increasing capacity and bundling intelligent controller capability together with the drive itself.

In 1986, Seagate added a total of 147,000 square feet of production space to its facilities in Bangkok and Singapore. By the end of 1986, 10,100 of Seagate's 11,872 employees were outside the U.S.

Revenue figures are in millions of dollars. Each increment represents $100 million.

51
STORAGE TECHNOLOGY CORP.

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A trimmer Storage Technology Corp. took some important steps on its road back from Chapter 11 and near ruin, and the company has predicted it will emerge from bankruptcy this year.

After three years of losses totaling $603.8 million, the maker of IBM-compatible disk and tape storage devices turned a profit in 1986, reporting net earnings of $36.2 million.

StorageTek made progress on the product front, introducing a couple of significant new tape drive offerings and finally achieving volume shipments of its key 8380E pcm disk storage device. Cutting its worldwide employee count to 8,400 from 15,000 helped StorageTek return to profitability; so did continued access to investors' and creditors' dollars—between $650 million and $800 million in cash, equity, and notes—that the company will have to pay out as soon as it leaves Chapter 11.

Through bankruptcy, StorageTek continued to invest research and development money in new products—$68.5 million in 1986 (in 1985 it spent $65.5 million). The result early this year was the introduction of a StorageTek 3480-class cartridge tape drive and an automated cartridge tape library to go with it. StorageTek hopes to become one of the first pcm suppliers of a 3480-class drive when it starts shipping its own 4480 product this quarter. And the company hopes to whip up interest in what it calls "nearline" storage, a $250,000 tape library positioned between on-line disk and off-line tape. While critics call the library too expensive, unproven, and unnecessary, StorageTek says it expects to ship as many as 6,000 tape libraries over the next five years, beginning in 1988.

Meanwhile, in 1987, StorageTek must rely on the strength of its existing products—nine-track tape drives, 3380-class disk devices, nonimpact printers, and solid-state storage devices. While it continues to command the lion's share of the market for solid-state storage devices, it fell behind IBM and lost ground to pcm competitors National Advanced Systems and Amdahl Corp. in the 3380 DASD market. By late 1986, however, StorageTek was shipping its 8380E drive in volume.

52
MOTOROLA INC.

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Motorola's semiconductor sales rose 9% in 1986 to $1.88 billion, after a disastrous 23% plunge the year before. The recovery helped Motorola report $5.89 billion in sales, a record high, up 8% from $5.44 billion in 1985. Earnings were $194 million, well more than double the $72 million profit the company made in 1985.

Data processing sales slipped, however, due to a 17% decline in sales to $229 million by Motorola Computer Systems. Formerly Four-Phase Systems Inc., the subsidiary was purchased four years ago for $250 million. The Information Systems Group, which makes modems and related communications equipment, did better, with sales rising 9% to $465 million.

Although the computer operation has lost money for four consecutive years, it is unlikely to be abandoned, as it constitutes a substantial market for other Motorola products. For example, two supermicrocomputers it introduced last year—the Vision/32 and the System 8000—use Motorola's 32-bit chip (MC68020), its VME bus architecture, and the Unix V/68, Motorola's version of the widely used AT&T operating system.

Edward F. Staiano, a senior manager, was assigned late in 1985 to oversee the operation, which had been left pretty much on its own since being acquired.

Staiano trimmed the work force, reduced manufacturing and overhead costs, and focused the company on minicomputer and microcomputer lines. Beyond adding the Vision/32 and the System 8000, the company beefed up its Series 5000 computers and introduced personal computer connectivity products based on the System 8000. To expand overseas markets, Philips International will distribute Motorola computer products in Europe.

In the Information Systems Group, Codex last year introduced a half dozen products, including the 2250 and 2260 Series V.32 modems for the dial-line market. Other introductions were the 6003 intelligent network processor, a point-to-point statistical multiplexor that supports up to eight asynchronous terminal ports, and the 4255 SNA Gateway, a cluster controller and protocol convertor.

53
MARTIN MARIETTA CORP.

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The information systems piece of Martin Marietta Corp. saw the future, and it wasn't in packaged software, so it sold its packaged program products to On-Line Software International Inc.

Not that the other pieces of the primarily aerospace company were anything to write home about. Corporate revenues did rise to a record $4.75 billion, a 7.7% increase over the previous high of $4.4 billion in 1985, but net income fell 18.8% to $202 million.

At least the company made money. All Martin Marietta Data Systems (MMDS) did was cut its losses and run. MMDS's sales jumped 8.7%, to $467.4 million from $429.9 million. That undoubtedly contributed to losses of only $3.7 million, compared with the previous year's $10.3 million.

On-Line, strictly a telemarketer until this move, paid $35 million for MMDS's RAMIS II, UFO, Consensus, and Unison products. MMDS retained the custom application software and services marketed in support of MMDS's primary systems business, principally Modular Application System (MAS) software and the Orlando 4000 data center computer services. MAS includes manufacturing, financial, and personnel application packages.

The sale marked the end of MMDS's attempt to restore RAMIS II to the glory days of the early 1980s. The product had been the market leader when MMDS bought it in 1982 from Mathematica. But as MMDS's emphasis shifted to systems integration and information systems in the federal sector, RAMIS II slipped behind Focus and has trailed badly since 1984.

Those negative vibes may have been reflected in yet another presidential shuffle. Patrick J. Zilvitis, who had been head of MMDS since October 1985, was replaced in January 1987 by Frederick Hudoff, who had been vice president in charge of the corporation's air traffic control division.

Outside the U.S., Hoskyns Group Ltd., MMDS's international subsidiary based in London, strengthened

its position as one of the leading computer services companies in the U.K. It was a major hit when MMDS took it public on the London Stock Exchange at the year's end and sold a 25% interest in it.

54
COMPAQ COMPUTER CORP.

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Being an IBM clone company is really very simple: copy whatever Big Blue is doing, add some bells and whistles, keep your prices down, and wait for the orders to come in. By doing all of this just right, Compaq's 1986 revenues grew 24% to $625.2 million. While that represents a leveling off of the steep trajectory Compaq's been on since its founding in 1982, it is still a handsome performance by any standard. Earnings soared 61% to $42.8 million.

Lately, however, Compaq has been acting less like a clone and more like a company that wants to set its own standards. In 1986, Compaq jumped ahead of IBM—and everyone else—by introducing the Deskpro 386, a personal computer based on Intel Corp.'s 80386 microprocessor. Compaq also beat IBM to the punch with two AT-compatible computers that use a speedier version of the Intel 286 chip.

These new high-end products are an important part of Compaq's business strategy. Compaq wants to distinguish itself from the pack of low-cost IBM clones on the market by offering products that are at the leading edge of pc technology. (These high-end products also have the highest profit margins.) At the same time, it can't stray far from the IBM standard. So far, Compaq doesn't seem to be having any problems. Some 12,000 Deskpro 386s were snapped up in the final quarter of '86, exceeding company expectations. Sales of all high-end products—the Deskpro 386 and the AT-compatible computers—accounted for about 72% of Compaq's revenues in the final quarter.

With international sales up 100% over 1985, Compaq announced that it was planning to build a $23 million manufacturing facility in Erskine, Scotland. Beginning this year, the company also intends to assemble printed circuit boards in Singapore.

Becoming a worldwide company may strain Compaq's hard-won operating margins, as will the cost of maintaining compatibility with IBM. Compaq put $26.5 million into R&D in 1986, a $10.6 million increase over 1985.

55
INTERGRAPH CORP.

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Intergraph Corp., the number two company in the CAD/CAM business behind IBM, had a respectable 15% revenue gain, to $605.7 million last year, and a 4% increase in earnings to $70.4 million.

Product announcements were encouraging: early last summer, Intergraph introduced two workstations—the InterPro 32C and the InterAct 32C—using Fairchild Semiconductor chips with five times the performance of Motorola 68020 chips being used in competitive systems. The company is introducing advanced versions of the workstations, with products called the 32C Extended and the InterPro II. These products signal Intergraph's expansion into a generic workstation market where it will compete with Sun Microsystems, Apollo Computer, Digital Equipment Corp., and others.

Intergraph, founded in 1969 as a software company, only recently began to offer full systems. Its products address three categories: mapping and earth sciences; architecture, engineering, and construction (AEC); and manufacturing, including design and manufacture of mechanical and electronics products. AEC and mapping made up 55% of its sales, mechanical accounted for 36%, and electronics 8%.

Intergraph generates more than a third of its revenues outside the U.S. It operates sales offices in 12 European countries and 17 other nations. It announced plans to build manufacturing and distribution facilities in the Netherlands to boost its European revenue, which was $68 million last year.

The company's data processing systems are based on DEC's VAX and MicroVAX II central processors. The latest generation of its own line of workstations function both as standalone engineering workstations and as terminals connected to a host system. Until the company begins to offer Unix-based applications software, however, nearly all of its new line of workstations will be used as terminal emulators for VAX-based systems.

56
CRAY RESEARCH INC.

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Cray installed 35 systems in 1986, up from 28 the previous year. Of the new installations, 29 were purchased, five were leased, and one was installed within the company. Cray now has an installed base of 148 machines worldwide, 10 of which are internal installations. Revenues for the year were $597 million, up 57% over the previous year—not quite as good as 1985's 66% growth. Net earnings were up 65%.

In August, the company announced a 12% improvement in cpu performance and price reductions on all one- and two-processor Cray X-MPs. The company improved the clock speed of the X-MP from 9.5nsec to 8.5nsec and dropped prices by $1 million, a 20% reduction. Two new models are the $7 million Cray X-MP/22, with two cpus sharing 2 million words of memory in 16 banks, and the $12 million X-MP/44, which has four cpus sharing 4 million words of memory in 32 banks.

The company introduced an entry-level system called the X-MP/14se, with one cpu and 4 million words of memory. The company claims it gives 80% of the performance of the high-end X-MP/14 at less than half the price: at $2.5 million, it is the least expensive Cray.

These announcements represent a shift in strategy for Cray, which until last year had always focused strictly on the high end of the market. Recognizing that it is no longer the only supercomputer game in town, particularly for low-end systems, Cray has responded to market demand for cheaper, smaller supercomputers.

Products in the works include the Y-MP, a follow-on to the X-MP, expected to be released in 1988; and the Cray-3, which will use Cray-produced gallium arsenide chips, and is expected to appear in 1989-90. Robert Ewald, vp of communications marketing, says Cray will make Unicos, the company's Unix-like operating system, available on all products within the next few years.

Since Cray now addresses a much broader customer base, the company is more susceptible to economic factors. The oil slump, cutbacks in federal funding for supercomputer centers and defense, and competition from Ja-

pan Inc., particularly outside the U.S., will all affect Cray in the coming year. Analysts predict a 30% revenue gain in 1987—still healthy, but diminished from the phenomenal growth in the past.

57
LOCKHEED CORP.

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Lockheed Corp. launched itself into the DATAMATION 100 this year, becoming the third aerospace company on the roster. The August acquisition of Sanders Associates Inc. skyrocketed the company's dp revenues to $551 million, up from $113.3 million in 1985.

California Computer Products (CalComp), Sanders' Anaheim, Calif., computer graphics subsidiary, helped fuel Lockheed's dp ascent. Now part of the parent company's Information Systems Group (ISG), based in Burbank, Calif., CalComp contributed an estimated $335 million to dp revenues.

Profits for ISG reached $10.2 million in '86, up from $3.7 million in '85. Over half—$6.2 million—of the group's '86 net income was garnered in the fourth quarter, after CalComp arrived in the ISG hangar. CalComp revenues, plus a turnaround at ISG's Metier Management Systems, accounted for a return to profitability for ISG.

Inspired by Sanders' defense electronics business, Lockheed bought the firm for $1.2 billion in a friendly takeover, a white knight rescue after Loral Corp. had made a hostile offer of $875 million. It was CalComp, however, that provided Lockheed with synergy—that elusive goal of every merger.

Where CalComp fits in so well is with ISG's CADAM Inc., a Burbank computer aided design and manufacturing software producer. Their product lines complement each other. In fact, the two firms share some customers. Thus far, they've been working together closely while maintaining separate businesses under the ISG wing.

ISG was formed in 1982 when Lockheed reorganized. In addition to CalComp, CADAM, and Metier, ISG includes Dialog Information Services Inc., Palo Alto, the world's biggest on-line data service; Datacom Systems Corp., Teaneck, N.J., a supplier of dp services to state and municipal governments; Lockheed DataPlan Inc., Los Gatos, Calif., which provides computerized weather advisories and other domestic and international flight services; and Lockheed Aircraft Terminals Inc., Burbank, an airport management and computer systems firm for commercial airlines' in-flight operations.

58
ZENITH ELECTRONICS CORP.

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Computers were a bright spot during an otherwise lackluster year at Zenith. Total corporate revenues were up 16% to $1.9 billion, with sales of Zenith's pcs accounting for most of the increase. Sales of tvs and VCRs, the company's main business, grew only 6%, with heavy competition from Japan and South Korea keeping prices down. Despite a profitable second half, Zenith ended 1986 losing $10 million.

Nonetheless, Zenith Data Systems had plenty to cheer about in 1986. First was the $242 million contract to supply Zenith's AT-compatible Z-200 pcs to the military. Then the IRS chose Zenith over IBM to supply portable computers under a $27 million contract. Zenith won that job with its highly popular Z-171 laptop; its sales have made Zenith number one in the laptop market. In October, Zenith received an 18-month renewal of its contract to supply eavesdrop-proof versions of its pcs to the military.

Sales of computers actually grew 56% to $548 million. High first-year costs associated with meeting the government contracts kept earnings down at the data systems division, as did expenditures on new product development. During 1986, Zenith came out with a new laptop, the Z-181, as well as its first 32-bit micro, the Z-386. The company also continued spending heavily on the development of "flat tension mask" technology for its video displays. Because the face of the tube is flat, it is virtually free from glare and reflection. Zenith is promising that brightness, contrast, and resolution will be far superior to conventional crts now on the market, without much additional cost.

Buoyed by the success of its computer products, Zenith has revamped its approach to distribution. After placing virtually all its emphasis on volume sales to corporate accounts, universities, and government agencies, Zenith is now going after the retail market. Early this year, Zenith decided to scrap its network of 18 distributors and deal with retailers directly through five warehouses around the country.

59
ARTHUR ANDERSEN & CO.

69 W. Washington St.
Chicago, IL 60602
(312) 580-0069

The same year we all liked Ike, Arthur Andersen did its first dp job, a payroll system for General Electric. Thirty-four years later, Arthur Andersen's 1986 dp revenues broke the half-billion dollar barrier, settling at $546 million, up 32% from 1985's $414.7 million. Overall, Andersen's Management Information Consulting Division revenues—which include strategic planning, studies, and training as well as dp—were $635.9 million. But Arthur Andersen's fame as an accounting firm still outweighs its dp and consulting clout, and in 1986 the firm's total revenues were just over $2 billion, up 20% over 1985.

Mel Bergstein, managing director of Management Information Consulting, says the company is handily exceeding its planned dp growth of 15% per year in hours billed to clients. Its dp business easily beats its competitors among the other Big Eight accounting firms: Andersen's dp revenues equal those of the other seven combined.

Unlike many other companies in the dp business, Andersen is adding staff. Last year, the Management Information Consulting Division's employee population rose to 11,008 from 1985's 9,407. Among them, Bergstein says, 9,000 are doing dp.

Andersen earns 70% of its consulting revenues in North America; 22% in Europe, including Ireland and the U.K.; 5% in Japan, Australia, and East Asia; and the remaining 3% in the Middle East, Africa, and Central and South America.

Its software products include MAC-PAC, a manufacturing package for IBM mainframes, designed to regulate the process from design engineering through scheduling and shop floor control. MAC-PAC/D is a specialized version of the system for defense contractors. MAC-PAC/38 runs on IBM's System/38 and adds distribution and financial systems to the mix. DCS is a distribution system that handles order processing, inventory control, warehouse management, and accounts receivable.

60
BASF AG

Carl-Boschstrasse 38
D-6700 Ludwigshafen, West Germany
(49-621) 601

BASF Data Technology, the dp subsidiary of the West German chemical giant BASF, turned in an 8% sales gain, reaching revenues of DM1.13 billion ($520.7 million) in 1986. Nearly three fourths of those revenues came from mainframe and peripheral sales, with the remainder generated by the company's magnetic media business.

The year's biggest change came in November 1986, when BASF announced the merger of its Hitachi-based pcm operations with Siemens' Fujitsu-based pcm business. The resulting company, Comparex, opened for business in Mannheim on Jan. 1. While Comparex includes BASF's pcm business, other peripherals, including disk and tape subsystems and magnetic media, remain a BASF concern. Held equally by the two West German partners, Comparex was initially capitalized at DM80 million ($36.9 million). Total turnover for the first year of operation, 1987, is targeted to top the DM1 billion level ($460.8 million), more than half of which will be generated outside West Germany.

Counting existing users, Comparex estimates it has around 3,000 customers in 10 European countries. The installed base of BASF and Siemens equipment runs to 650 processors and 30,000 peripherals. The joint venture company has a work force in excess of 1,000 people, over 50% of whom are involved in service and support.

While still under the BASF label last year, the data technology division added new top-end Hitachi mainframes to its 7/90 line of IBM-compatible processors. The addition of the 7/90-8 takes the range up to 70MIPS. BASF has sold Hitachi's mainframes for 16 years. Those sales amounted to DM600 million ($276.5 million) last year. Following a 1985 marketing agreement, the company continues to supply Nixdorf with Hitachi-built mainframes in the 1.3MIPS to 2.8MIPS range. Nixdorf sells the systems as the top end of its 8890 series. BASF also supplies South African company Persetel with machines.

Capital expenditures rose throughout the BASF group last year, while R&D spending in the dp divisions was up 31% to DM320 million ($147.5 million).

61
COMPUTERVISION CORP.

100 Crosby Dr.
Bedford, MA 01730
(617) 275-1800

In 1986, Computervision began a financial turnaround: after six consecutive money-losing quarters, the company entered the black in the third quarter and posted even stronger results in the fourth. The number three company in the CAD/CAM/CAE industry—after IBM and Intergraph—Computervision still ended 1986 with a loss of $5.8 million. But the year's results represented a major improvement over 1985's loss of $80.8 million.

The improved profit picture at Computervision was achieved partly through strict cost containment, including a significant reduction in its work force in 1985. Revenues rose 12% in 1986, to $494.7 million from 1985's $441.1 million. Despite the rise, last year's results fell below the high-water mark of 1984, when Computervision made a profit of $41.4 million on revenues of $556.3 million.

Computervision's 18-month downturn reflected difficulties in revising its product line, from one based on proprietary devices to one based on industry-standard hardware. Today, Computervision's three major products groups—the Computervision Automated Design and Drafting System family of software and workstations (including the mainstay CDC 4000 and the newer CADDStation systems), the Medusa series, and the Personal Designer series—include systems based on proprietary hardware as well as hardware from Digital Equipment Corp., Prime, Sun Microsystems, and IBM.

In the fourth quarter, CADDStation—introduced in April 1986—accounted for 38% of product revenues and 46% of orders; by year-end, it had surpassed the CDS 4000 as Computervision's best-selling product line. Moreover, about a quarter of the orders for the new line are from new customers.

Some potential customers, according to one Wall Street firm, have complained about the CADDStation's $50,000 cost per station in networked configurations, about $10,000 higher than competitors' prices per station. The CADDStation line seems to be an important profit maker nonetheless. Results for 1986 were also helped by stronger than anticipated foreign sales.

62
MANNESMANN AG

Mannesmann Ufer 2
4000 Dusseldorf 1, West Germany
(49-211) 8201

The sharply lower value of the dollar—down more than 25% against the deutschmark last year—depressed the Mannesmann group's dp results for 1986. Sales of computer products at Mannesmann Kienzle, the group's dp systems subsidiary, were essentially flat at DM1.06 billion ($489 million).

In West Germany, Mannesmann Kienzle performed well in the banking and government office sectors, where sales shot up by 40% and 29%, respectively.

The concentration on vertical market sectors intensified through 1986 as the company restructured to give its foreign subsidiaries a higher profile in their local markets. Replacing its previous method of imposing vertical marketing strategies from headquarters in West Germany, Mannesmann Kienzle set up specialist Competence Centres early this year. These centers will focus on the company's niche markets, namely manufacturing, financial, public administration, distribution, and printing. But they will also pursue a policy of developing products and strategies for markets in particular countries. In the U.K., for example, Mannesmann Kienzle's subsidiary is targeting the manufacturing, printing, transportation, and legal markets.

Currency fluctuations took a particularly heavy toll on Mannesmann Tally, the conglomerate's printer maker. It recorded unspecified losses despite increasing its printer sales in both the U.S. and the U.K. Mannesmann Tally describes its printer business as export intensive and therefore prey to the sharply lower value of the U.S. dollar.

Despite the setbacks, Mannesmann confirmed its commitment to the dp business with the acquisition of two dp-related firms. The parent company acquired 65% of Peripherie Computers Systeme GmbH (PCS), Munich, in May, adding the PCS Cadmus Unix-based CAD/CAM system to its product line. PCS reported sales of DM45 million ($20.7 million) for 1985. In October, Mannesmann Kienzle took full control of Alfa System Partner GmbH, West Germany, which specializes in printing and typesetting and has annual sales of DM20 million ($9.2 million).

63
RACAL ELECTRONICS PLC
Western Rd., Bracknell
Berkshire, England
(44-344) 481222

Racal Electronics bounced back during 1986, with record dp revenues up a healthy 7% to £319 million ($469 million). It was an antidote to a gloomy 1985, when dp sales dropped almost 18%. Racal is now creeping back to the revenue level it reached in 1984.

Stronger demand in the data communications sector during the second half of the year was a big help. The British market is still by far Racal's strongest, providing 39% of revenues. Elsewhere, the company's Australian and Asian sales brought in 17%, Europe contributed 14%, and Africa 5%. In the past, Stateside operations, once known as Racal-Vadic and Racal-Milgo, had contributed as much as 40% of Racal's total revenues. Last year, Racal Corp., based in Boca Raton, Fla., kicked in only 25%.

A continuing success story for the company in 1986 was the Planet local area network system, a flagship product for many years. This token ring product is now installed at approximately 500 sites worldwide and is the European market leader. The company ascribed much of that success to the system's ability to support networked pcs and multipoint networks.

Racal introduced new products during the year aimed at expanding its corporate networking capability. These include the Racalnet programmable network processor, which can be used as a network node and offers between six and 1,000 ports. Also launched was the Omnimux 2000, a switching multiplexor-based system that can be used as a data PBX.

Racal also worked with the Scicon software and services subsidiary of British Petroleum to offer facilities management for large networks. The two firms will jointly bid on a major contract to set up the Government Data Network, which will link the U.K.'s top ministries.

64
HARRIS CORP.
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Melbourne, FL 32919
(305) 727-9100

Harris's corporate revenues for calendar 1986, $2.09 billion, represent a 9.4% decline from 1985. Its worldwide dp revenue also fell, although the 3.3% drop—to $464 million from $480 million—was not nearly as precipitous. (That figure does not include the Lanier Image Processing Division, which on Jan. 1, 1986, became a nonconsolidated joint venture, Harris/3M Document Products.) Still, net income, the number that matters, rose a tidy 13% to $68.6 million from $60.7 million.

Part of that success is attributable to the fact that the company got leaner and meaner. The number of employees decreased 15%, to 26,700 from 31,400, as part of a reorganization and consolidation that purportedly allowed the company to increase market focus and improve operating results.

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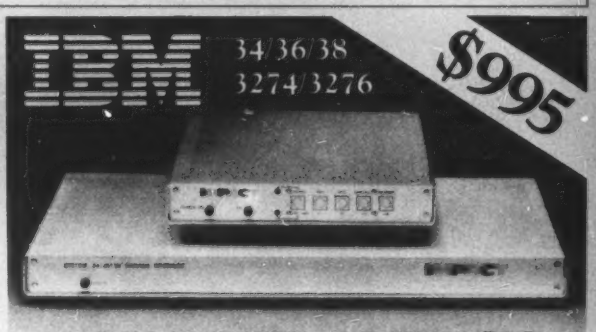

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"Because of the general softness of the markets in which we participate, Harris's Information Systems sales declined slightly in 1986," says Stephen Coleman, vp of marketing for the Information Systems Sector. "However, we experienced an upturn in orders in the latter half of 1986 as a result of a focused marketing program and our new product introductions."

Among other changes, the Information Systems Sector was broken into two sectors, the Lanier Business Products Sector (formerly the Business Informations Systems Sector) and the Information Systems Sector.

Information Systems led the charge against Digital Equipment Corp., which Harris considers its main competition. The company's Computer Systems Division introduced the MCX series of 32-bit supermicros in May '86. The MCX-3 and MCX-5, built around the Motorola 68020 microprocessor, extend Harris's CS series of Unix-based computers and complement the HCX-7, which the company introduced last year. The MCX line is composed of the single-processor MCX-3 Model 40, the single- or dual-processor MCX-3 Model 60 and MCX-5 Model 60, and the two- to four-cpu MCX-5 Model 70.

65
ATLANTIC COMPUTERS PLC

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12-15 Fetter Lane
London EC4A 1BR, England
(44-1) 583-9481

Atlantic Computers scored an immense 75% rise in revenues to £320 million ($471 million). The company's profits are also up, rising 23% to £20.3 million ($29.9 million).

The growth is partially attributed to a company restructuring, which split the operating companies into four groups: computer services, DEC systems, manufacturing, and financial services. The key reorganization was in Atlantic's IBM computer leasing and distribution operations. These were merged into a new computer services group following the acquisition of the Netherlands-based ICA Group in December. ICA sells configured IBM and DEC systems and is expected to vastly improve Atlantic's standing in Europe.

Expanding its West German operation, Atlantic acquired BM Computer Systeme GmbH, a supplier of IBM equipment and services. In the U.S., Atlantic concluded its first full year of business. In the U.K., the Atlantic Computer Systems subsidiary set up a new ICL systems division. The subsidiary also made its first major installation in the Middle East and is reviewing the possibility of setting up an office in Hong Kong to target the Chinese market.

Among Atlantic's other groups, the DEC business was ahead of schedule: the Computer Systems Division, the DEC group's principal company, installed its first computer integrated manufacturing system and started a secondhand equipment business, brokering reconfigured DEC equipment.

Within the manufacturing group, Atlantic invested over £1.5 million ($2.2 million) to expand its data communication and networking product portfolio. The fourth group, Financial Services, encompasses Atlantic Medical as well as the company's financial services business. It will be augmented by a general capital asset financing unit, Atlantic Leasing, this year.

66
CAP GEMINI SOGETI

11 rue de Tilsitt
75017 Paris, France
(33-1) 42 67 97 57

Cap Gemini Sogeti consolidated its position as Europe's largest software and services company in 1986. Revenues rose 32% in local currency to FF2.9 billion ($419.9 million), while earnings jumped 50%, to FF190 million ($27.4 million). About one third of that revenue growth came from acquisitions.

By far the most important development in 1986 was the absorption of the U.S. firm CGA Inc., which was merged with Cap Gemini DASD to form Cap Gemini America. The group considers its U.S. operation to have reached the critical mass necessary to operate profitably in the American market. The acquisition more than doubled U.S. revenues to $120 million, and earnings were also more than doubled.

The company's other acquisitions in 1986 were on a smaller scale, although significant in the markets concerned. Cap Gemini doubled the size of its West German operation with the takeover of IBAT, a firm specializing in industrial automation. It also broke into the Italian market through the purchase of GE-DA, a developer of systems for large corporations and governmental administrations.

Cap Gemini continued to do well in its traditional markets, picking up a steady stream of contracts for videotex services, integrated information systems, and software engineering. Geographically, the company has achieved the three-way balance it has sought: in 1986, 28% of revenues came from the U.S., 37% from France, and 35% from the rest of Europe.

Cap Gemini is financially strong, having built up a war chest of FF1 billion ($144.3 million) with share and bond issues in 1986. The group was capitalized at FF7.5 billion ($1.1 billion) at the end of 1986, 50% more than a year earlier, and by mid-March 1987 had climbed to a value of FF10 billion ($1.6 billion).

67
XIDEX CORP.

2141 Landings Dr.
Mountain View, CA 94043
(408) 988-3472

A two-year spurt of acquisitions brought Xidex Corp.'s revenues to $533 million in 1986, three times what they were in 1984. As with so many companies in the computer storage business, however, Xidex reported disappointing earnings toward the end of the year but promised a better 1987.

Xidex was formed in 1969 and until 1985 was involved in computer microfilm and floppy disks. Its sales in 1984 were $178 million. Acquisitions since then have placed the company in markets for rigid disks, computer tape and cartridges, antiglare computer screens, disk drive diagnostic tools, and software duplication. Its revenues were up 56% last year and its earnings rose a healthy 27%, mostly due to the $23 million the company made in the fourth quarter by selling 1.7 million shares of stock it held in Seagate Technology Corp., another storage company. (In the same quarter, Xidex wrote off $16.4 million in unused real estate and obsolete equipment.)

After the acquisitions binge, the company concentrated in 1986 on integrating its new operations. It formed a data products division to include the floppy disk drive line and such related products as computer tape and cartridges and 14-inch rigid disks. Then it combined the small rigid disk businesses of Dysan Corp., Charlton, TriMedia, and Oktel into the data disk division. The company noted that the small disk market grew last year at a 50% rate. It

is the fastest-growing segment of the disk market.

Xidex's micrographics business now accounts for less than 25% of sales, but the company noted that last year it supplied 70% of the world demand for duplicate microfilm. Export sales accounted for 27% of Xidex's 1986 revenues.

68

SAMSUNG ELECTRONICS CO. LTD.

7 Soonghwa-dong
Choong-gu, Seoul, South Korea
(82-2) 751-6114

Samsung is the top electronics company in South Korea, registering W348.3 billion ($396 million) in dp sales alone. Profit margins were highest on overseas oem orders for monitors, workstations, and pcs. The company clinched some spectacular oem orders last year, beginning with IBM, which ordered 1 million display monitors from Samsung last May. Near the end of 1986, NCR and Vendex, the Michigan-based auto parts group, closed deals with Samsung to supply AT-compatible products in 1987.

Costly end-user support continues to cut into the profits of domestic computer sales. Sales for two products did not take off in 1986, the SSM-32 and the UNIX-32, which attracted mostly in-house customers and government institutions. Samsung, like GoldStar and other Korean dp hardware vendors, is hurting because of its own inability to offer an open-ended growth path in dp hardware and customers' lack of confidence in locally designed products. Samsung continues to build NEC's N5200 micros, and assembles and sells NEC ACOS mainframes.

Samsung/Hewlett-Packard, 55% owned by HP, claims that sales grew by 40% in 1986. Systems and instrumentation each accounted for half of the sales of the three-year-old joint venture. Major new product introductions included the Spectrum series—upgraded versions of the HP 3000 and HP 9000—and the 16-bit Vectra, South Korea's first dual-processor pc that offers true compatibility in English and Korean without the need to reboot.

The central office exchange business is a profitable one. Samsung has been building the M10CN high-capacity switch for seven years under license from ITT but the product's future in South Korea is in doubt and so is Samsung's relationship with ITT.

In the PBX market, Samsung installed about 12,000 lines of the Rolm CBX-II last year, but profit margins were shaved by competitors such as Daewoo Telecom, which makes Northern Telecom's SL-1, and GoldStar Telecommunication, which makes the NEC NEAX-2400.

Samsung has opened negotiations with IBM with the goal of forming a joint venture company specializing in systems integration—a counterpart to Systems Technology Management, the GoldStar-EDS joint venture—and entering the value-added network business once the government relinquishes its monopoly over the data telecommunications business.

69

APOLLO COMPUTER INC.

330 Billerica Rd.
Chelmsford, MA 01824
(617) 256-6600

Apollo reversed a late 1985 revenue slide with a move into the low-cost workstation segment dominated by Sun Microsystems Inc. The $10,000 Domain 3000 workstation helped Apollo capture customers in Sun's traditional software engineering and electronic publishing markets.

Aided by strong European demand, acceptance of the Domain 3000 returned the company to double-digit growth rates. Overall, international sales continued their sharp climb, accounting for 48% of total revenues, up from 31% in 1985 and 18% in 1984.

For the year, revenues rose 32.5% to $391.7 million, up from $295.5 million in 1985. This helped Apollo close the year with a profit of $9.3 million compared with a loss of $1.5 million in 1985. Its stock price similarly rebounded from a low of 9¼ early in the year to 18¼ at the close.

Domain 3000 deliveries have led executive vice president Roland D. Pampel to predict Apollo's total shipments would exceed 20,000 this year.

The move into the low-end market emboldened Apollo to look at another segment of its business, engineering networks. Digital Equipment Corp. had already staked its claim to the engineering workstation market with a homogenous network approach, selling its VAXstation workstations as adjuncts to VAX host computers. Seeking an advantage over DEC through third-party alliances, Apollo recast its Domain LAN as a heterogenous systems LAN and began lining up support among specialized processor makers.

Apollo promised to release specifications of its Domain protocols and give its Domain network users transparent access to VAX RMS, Sun's Network File Systems, and OSI/FTAM file systems. The approach allowed Apollo to broaden its existing agreements with such specialized computer vendors as 64-bit computer maker Alliant Computer Systems Corp., Lisp workstation supplier Texas Instruments Inc., and database machine vendor Britton Lee Inc.

70

AGS COMPUTERS INC.

1139 Spruce Dr.
Mountainside, NJ 07092
(201) 654-4321

Owing to aggressive acquisitions and big growth in its software and distribution businesses, AGS Computers Inc. has emerged as one of the largest companies in the software and services industry. In 1986, revenues jumped 37% to $381 million, while net income rose to $8.8 million from $7.5 million.

Founded in 1967, AGS now has two major lines of business: software products, both custom developed and packaged programs, and distribution of microcomputers and related peripheral equipment. The custom software products business grew a healthy 23% in 1986, primarily on the strength of business from brokerage firms and banks, says Lawrence J. Schoenberg, chairman and chief executive. But the packaged programs business inched up only 4% last year, largely because of what Schoenberg describes as a "poor year" for large computer productivity tools.

AGS entered the government market in 1986 through the acquisition of Genasys Corp., Rockville, Md., a project software developer and systems integrator in the federal government market. For $19.5 million it bought Vista Concepts, New York, which provides software to banks for security processing and handling. It also acquired APR Inc., Columbus, Ohio, which provides custom programming for the communications industry; Systemtech Inc., a professional services company in Dallas; and branch offices from Compuware in San Diego and Houston. It paid a total of $6.7 million for Genasys, APR, Systemtech, and the Compuware offices.

On the downside, AGS experienced fallout from AT&T's retrenchment in the computer industry. AT&T and affiliates represent AGS's largest account. Revenues dropped to $25 million in 1986 from $29 million in 1985.

71
SHARED MEDICAL SYSTEMS CORP.

51 Valley Stream Pkwy.
Malvern, PA 19355
(215) 296-6300

Serving a health care industry beset by financial and competitive pressures has kept Shared Medical Systems revenues in a climb that they've maintained for five years.

While 1986 revenues of $374.9 million were 20% above the 1985 total of $312.2 million, earnings didn't fare as well. They fell by 23% to $32 million from $41.7 million, adversely affected by shutdown expenses of a Japanese subsidiary. These caused a second-quarter loss of $10.6 million.

Reimbursement policies favoring outpatient care, more stringent insurance eligibility standards for inpatient care, and technology advances expanding the scope of outpatient services resulted in a dramatic increase of activity in those areas during 1986. SMS, which derives the majority of its revenues from systems and services provided to acute care hospitals, enhanced its outpatient offerings for both physicians and administrators.

The company expanded its IBM PC workstation offerings to include a Medical Record Workstation that supplies traditional workstation capabilities and adds such functions as medical record abstracting and coding. Under development is an application device that will enable hospital personnel to collect and review patient data wherever the patient is located.

SMS last year continued development of a growing line of consulting services for physicians to whom it offers professional advice on a variety of financial matters. This comes under its Practice Management and Consulting Services operation for which it opened new offices in the South and Midwest during the past year.

Though it has bowed out of Japan, SMS has ongoing operations in the Netherlands, Canada, the United Kingdom, Ireland, West Germany, and Spain.

72
FERRANTI PLC

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Cheadle, Cheshire SK8 4HZ, England
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Business picked up last year for Ferranti's Computer Systems Division. Even so, it is still an unsettled operation: early this year, rumors spread that 500 staffers would be laid off in 1987. The reasons cited were that the company's core business in defense systems had suffered because of a slowdown in overseas orders and cuts in U.K. defense spending. Still, sales in the civilian sector clearly propped up falling defense revenues.

A few large orders, such as a £5 million ($7.4 million) deal with the Royal Navy for 17 of Ferranti's Argus minicomputers, and the hard-won status of preferred supplier of pcs to British Rail, helped push Ferranti's worldwide dp revenues up by 16% to £239 million ($351.5 million) during 1986.

Ferranti Computer Systems is split between three major U.K. sites: Wythenshawe, which specializes in automated process control equipment, management systems, communications, and office systems; Bracknell, which concentrates on defense contracts; and Cheadle Heath, which is involved in both civil and defense deals, and which develops sonar and monitoring systems. Each is reported to have performed well, although the Bracknell site took the brunt of the defense spending cutbacks.

Among the company's overseas dp interests is Ferranti International Controls Corp. in Houston, which works with Wythenshawe to develop control systems for the electricity supply industry. Other dp-related subsidiaries operate in West Germany, Benelux, Australia, and Brazil. Much is expected of the U.S. operations, which managed to rack up over $100 million in revenues in 1986.

Last year's new products from these Ferranti companies included AT and XT extensions to Ferranti's line of IBM-compatible pcs. These higher-performance machines fit the Ferranti product philosophy of offering pcs as part of larger systems deals rather than marketing the machines as standalone units. With the recent IBM attack on this sector of the micro market, though, the company is now reassessing its pc development strategy.

73
DATAPRODUCTS CORP.

6200 Canoga Ave.
Woodland Hills, CA 9136
(818) 887-8000

Dataproducts Corp. put away the red ink in 1986 despite revenues that were down more than 5% to $350.8 million from $370.6 million. It was clear proof that belt-tightening can pay off, and the company continues to bill itself as "the world's leading independent computer printer manufacturer."

Dataproducts went from a loss of $29.7 million in 1985 to earnings of $12.8 million last year, a heartening turnaround but still a far cry from the $35.8 million earned in 1984.

Appropriately, the company's annual report for fiscal year 1986, which ended March 9, 1986, dwelt on "weathering the storm," and its cover was of that yellow stuff of which rain slickers are made. A two-page centerfold showed company management attired in such slickers, their images reflected in a puddle.

The self-proclaimed "leaner and more aggressive (not meaner)" Dataproducts changed top management in '86. Jack C. Davis was brought in from Harris Corp. to be chairman and chief executive officer. At Harris, he had been a senior vice president. Later, following the retirement of Graham Tyson, cofounder and president of 25-year-old Dataproducts, Davis also assumed the presidency.

Trimming down included closing three manufacturing plants and laying off more than 25% of the work force, reducing the number of employees to 4,200 worldwide. It wasn't all cutting back, though. Last November, the company formed a wholly owned Canadian subsidiary called Dataproducts Canada Inc., Richmond Hill, Ont.

Dataproducts has begun a move to concentrate on the high end of the printer market, particularly nonimpact printers and page printers utilizing laser technology. The company continues to produce thermal and solid ink nonimpact printers as well as band, daisywheel, and serial dot matrix printers in the impact class. Performance characteristics range from speeds of 20 to 400 characters per second for serial dot matrix printers to speeds of 300 to 2,000 lines per minute for line printers, and speeds of 12 to 26 pages per minute for page printers.

74

TEKTRONIX INC.

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Beaverton, OR 97077
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Tektronix's fiscal year ended on a dreary note in May 1986: earnings plunged 56% on a 9% drop in sales. With little sign of a turnaround, the company took what it called a painful step, laying off 2,000 employees, bringing the total work force to around 17,000 from an all-time high of 24,000 in 1981. Another program was aimed at reducing manufacturing costs as a ratio of sales to 45% from 55%; it accomplished this late last year.

The cost-cutting worked: three consecutive quarters saw an increase in earnings, for a nine-month rise of 37% over last year's comparable period.

Design automation and information display activity accounts for nearly all of the company's data processing revenues, which totaled $350 million in 1986, a decline of about 5% from 1985. Total corporate sales in calendar year 1986 were $1.3 billion, off 6% from the year before. Earnings, at $55 million, declined 21%.

Hottest of the 12 products in the dp category are graphic computer terminals, computer aided engineering systems, and artificial intelligence systems.

To speed its entry into computer aided engineering markets, Tektronix acquired CAE Systems two years ago, but failed to realize any growth last year because of extensive debugging and an overall slowdown in the market. Tektronix, which has been selling micro development products since 1978 through its Software Development Products Division, says it is launching a major drive to develop productivity tools for software engineering. It renamed the division the CASE division (for Computer Aided Software Engineering) and last summer announced a series of structured analysis tools, design tools, and a 32-bit microprocessor development system for Motorola's 68020 and Intel's 80286 chips.

In answer to an edict from management, each of Tektronix's 20 divisions plans to turn out one major new product a year, and, over the next three years, product development cycles are to be cut in half. As a result, the company's R&D budget has begun to climb, rising to 14.5% of sales last year from about 11% in 1984.

75

NORSK DATA AS

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Despite a slowdown in its home market, Norsk Data AS increased worldwide revenues by 36% in local currency to NOK2.58 billion ($349.1 million). Net income for the year rose 28% to NOK468 million ($63.3 million).

In Norway, the company has become known as "the millionaires' factory" because each employee is offered annual options to buy shares and, with sales increasing at a compound rate of 45% over the last decade, it has managed to create more millionaires than any other company in Europe.

Norsk Data continues to derive the bulk of its revenues from Scandinavia, where sales in Norway, Sweden, and Denmark account for 70% of the total. Last year, Norsk initiated a push to increase its presence elsewhere in Europe. Its target markets on the way to achieving a Continental business goal of over 30% of revenues are West Germany, the U.K., and France, where the company has a tie-up with Matra Datasystems. This business accounted for around 22% of last year's total.

Enhancements to Norsk's minicomputer line in 1986 included additions to the ND-500 line of 32-bit superminis. Central to this was a front-end processor to handle the increased number of terminals supported by the new extended version of Norsk's Sintran operating system. In 1987, Norsk has added processors built around 32-bit CMOS microprocessors with a performance range of from 1MIPS to 8MIPS.

76

SUN MICROSYSTEMS INC.

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Laying the groundwork for a move out of its workstation niche was at the forefront of Sun Microsystems' plans in 1986. Heretofore a supplier of low-cost engineering workstations, the company prepared itself to participate in a broader set of markets. First, it sought the financial backing by way of two public stock offerings, and then it attempted to shake off its low-end image with a move to higher-performance and multiuser systems through its Sun-3/200 Series computers.

The continuing industry downturn notwithstanding, the pursuit of new markets was not a reflection of poor sales in its core markets: sales for the year more than doubled—propelling Sun onto the DATAMATION 100—and earnings were three times the levels of 1985.

Revenues for the year were $341.1 million, a dazzling increase from $147.1 million in 1985, while net income soared to $24.5 million. International revenues accounted for nearly a third of total sales. An initial public offering in March netted $45 million and led to a secondary offering that brought the total to $125 million.

Among its moves to capture a broader customer base, Sun released an IBM PC-compatible coprocessor enabling its workstation users to run PC/DOS applications. The company also moved to broaden its applications library with the release of SunOS, an operating system revision incorporating Unix System V and Berkeley 4.2. At year's end, the company boasted some 900 available applications.

Sun's software thrust paralleled the expanded connectivity linking its workstations to minicomputers. Sun's Network File System, a distributed file sharing scheme, was adopted by Data General, Hewlett-Packard, and Digital Equipment Corp., among others, for their Unix-based computers. The Network File System enables such systems to share data transparently with Sun workstations.

77

BRITISH TELECOM PLC

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British Telecom, enjoying the freedom and funds that came with its privatization in 1984, went on a shopping spree last year, looking for companies to bolster its international standing.

Early in 1986, BT concluded its purchase of a 51% stake in Canada's Mitel, but was prevented by the Canadian government from taking over the Canadian telephone network company, Teleglobe. BT then moved on to the U.S., where it bought ITT Dialcom and its electronic mail services, which have 100,000 subscribers worldwide. Closer

to home, BT scooped up the core businesses within STC's IAL cellular radio and satellite subsidiary, giving BT a firmer foothold in a number of international markets dominated by Cable & Wireless.

Several alliances also added to BT's dp product lines: it signed with Zenith Data Systems to resell Zenith's pcs through the BT Merlin office systems subsidiary, began manufacturing Unix systems under license from the U.K.'s Bleasdale Computers, and it also signed a $5 million oem deal with Stratus. It joined 13 other companies in committing to the X.400 messaging standard and heralded the growing importance of integrated voice and data networks with the founding of its Communications Facilities Management Service.

Dp revenues, including Dialcom's and Mitel's digital PBXs, were £224.7 million ($330.4 million) out of total revenues of £9.5 billion ($14 billion).

BT will find it harder to please its shareholders in 1987, facing a challenge for large customers from newly formed Mercury Communications. But to keep profits rising, BT says it will cut 24,000 jobs over the next four years. These cuts, and the BT privatization itself, have obviously found no favor with U.K. labor unions. BT ended the year in protracted talks over pay and working conditions, and strike threats seemed likely to turn into strike realities.

At year's end, Mitel had some cheerful news: its first profitable quarter in nearly two years. While revenues rose 38% in U.S. dollars, to $406.3 million, Mitel still finished $140 million in the red, mostly a result of big write-offs last summer.

78
DIEBOLD INC.

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In 1986, Diebold did what all companies selling computer-based ATMs and security equipment to banks were doing: it drastically cut back on costs. Result: a profit of $34.9 million, 15% over last year when Diebold earnings had dropped 47% and sales declined 13%. Sales of $414 million were a mild increase of $2.7 million over 1985.

What it didn't cut was R&D: over the last two years, Diebold has invested nearly $33 million. The market leader in sales of automated teller machines, Die-

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CIRCLE 63 ON READER CARD

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CIRCLE 64 ON READER CARD

bold last year announced 26 new products—one of them expected to answer the two-year-old decline in sales to banks. The new product is a much smaller ATM than is standard, priced in the $10,000-to-$15,000 range, about half the usual ATM price.

High price (annual maintenance alone can run $12,000 on an ATM) and market saturation both contributed to the sales decline, Diebold believes. In all, some 60,000 ATMs are now installed in the U.S., and predictions that 150,000 or 200,000 machines would be in use by 1990 have now been scaled back to well under 100,000.

With its new product, Diebold thinks the momentum will resume, as smaller banks discover that the lower price and limited function of dispensing money will appeal to customers. Diebold envisions the new ATM, which it calls the "everywhere teller machine," in rural areas and in retail stores.

Diebold introduced an interactive video system through which consumers can obtain information on events and tickets, and this August it will begin delivering 2,000 videocassette vending machines to Group 1 Entertainment, Los Angeles, under a $36 million contract signed last October.

Diebold, along with the rest of the ATM industry, is heading in two directions: toward more sophisticated equipment with more capabilities, and toward simpler and cheaper machines requiring less maintenance.

79
DATAPOINT CORP.
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Datapoint Corp. has cut its losses but continues to operate under a black cloud. The beleaguered company lost $1.8 million in 1986 on revenues of $325 million. In 1985, losses totaled $62.1 million on revenues of $404.2 million. The lesser loss was attributable to cost-cutting, particularly in employment expense.

Just after the close of '86, Edward P. Gistaro, president and chief executive officer, who earlier in '86 had talked of "a significantly different and improved company . . . beginning to see positive results," resigned for "personal reasons." His successor, Doris D. Bencsik, who had been executive vice president and chief operating officer, has continued to fight the battle against red ink since that time and has had the unenviable task of firing 786 employees.

Of course, Asher B. Edelman, the New York investor who owns 8% of the company and who once proposed to take the company private through a leveraged buy-out, is still very much in the picture as chairman. Currently, he is the target of a shareholder suit.

Datapoint, which 10 years ago pioneered the concept of local area networks, announced enhancements to its Starfleet family of office automation products, including an 80286-based applications processor, an AT-compatible file server, a desktop laser printer, an advanced SNA communications facility, and new high-speed modems. Datapoint also announced enhancements to its ARC (Attached Resource Computer) local area network, which were designed to reflect a new marketing thrust by targeting departmental or corporate systems requiring integration of dissimilar equipment.

The highlight of the announced enhancements was Starship II, a multiprocessor system supporting from 40 to 120 users. The company also rewrote its RMS (Resource Management System) operating system using a high-level systems development language to support the 80286 multiprocessor technology. These October announcements, says vice president of product development Larry D. Wickwar, add up to a solution that competes in power and capacity with such standalone systems as Digital Equipment Corp.'s VAX 8200s and 8300s, while providing the benefits of ARC local area networking.

80
CONTEL CORP.
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When Contel—previously known as Continental Telecom—closed its books on Dec. 31, 1986, revenues were up 17.2% to $3.07 billion, thanks in part to some major acquisitions it made in '85. Consolidated net income rose 2.6% to $232.9 million from $226.9 million. If one follows the company's line and excludes one-time 1985 charges and gains, and the loss of the Investment Tax Credit—wiped out by the Tax Reform Act of 1986—overall earnings increased 20%. DATAMATION estimates that dp revenues rose 12% to $311 million.

No wonder Washington, D.C.-based Comsat (Communications Satellite Corp.) wants to buy Contel. A proposed $2.5 billion merger, approved in September by shareholders of both companies, would make Contel a wholly owned subsidiary of Comsat, which is one fifth of Contel's size. The deal calls for the issuance of 71.4 million new Comsat shares and a $2.5 billion stock swap. Contel executives would manage the new $6.6 billion company. The Comsat name would be retained, but that would be about the only reminder of the company created in 1962 to represent the U.S. in Intelsat, the international satellite consortium.

But none of this may come to pass; in March '87, when the Federal Communications Commission ordered Comsat to refund about $62 million of what the agency contended were excess profits, Contel decided to take a hike. That didn't exactly make Comsat's day, since it had lost $41.5 million in 1985, so it refused to accept the cancellation, saying it would do everything it could to see that the deal went down as scheduled. On April 30, there was further fallout when Contel president and ceo John Lemasters resigned over "differences in both management philosophy and operating policy." Contel denies that his departure was directly linked to the cancellation attempt, but the smart money says otherwise.

81
BELL ATLANTIC CORP.
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Philadelphia, PA 19103
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Acquisitions in computer maintenance, leasing, and turnkey systems put Bell Atlantic Corp. solidly in the dp business. Bell Atlantic owns Sorbus, one of the top third-party computer maintenance firms. Founded in 1971 as part of Management Assistance Inc., Sorbus claims to service more IBM equipment than anyone else, relying on 1,600 field engineers to maintain everything from printed circuit boards to mainframes.

Sorbus accounts for the bulk of Bell Atlantic's dp revenues, which DATAMATION estimates at $310 million in 1986. Computer leasing revenues will swell that figure substantially in 1987. In October, Bell Atlantic acquired Greyhound Capital Corp. of Phoenix. With annual revenues in the $200 million range and an employee count of about

350, the acquisition makes Bell Atlantic one of the top five players in the U.S. computer leasing market.

In 1986, Bell Atlantic also made two acquisitions in the Digital Equipment Corp. world. In December, the company acquired Technology Concepts Inc. of Sudbury, Mass., a communications and custom software company that offers CommUnity, a networking software product designed to permit a wide range of computers to work with DEC systems on a DECnet network. Also in December, Bell Atlantic acquired Electronic Service Specialists Ltd. of Menomonee Falls, Wis., which provides parts service for DEC systems.

Bell Atlantic has a stake in turnkey systems through MAI Canada, which supplies systems based on Basic Four computers for the automobile dealer, health care, and municipal government markets.

Taken together, the nontelephone businesses are the fastest-growing part of Bell Atlantic, one of the regional Bell operating companies created by the 1984 divestiture of AT&T. In 1986, revenues from Bell Atlantic's nonregulated side were up 41% to $601.1 million. Total revenues were $9.92 billion, a 9% increase over 1985. Net income was up 7% to $1.2 billion.

82
CSK CORP.

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Japan's largest independent software house is trying to participate in what it hopes will be the transformation of the country's software industry. Traditionally, Japanese large computer users have had an aversion to software packages, insisting instead on custom software. CSK grew into the leader in its field by catering to these preferences: instead of creating its own products, CSK has been the premier supplier of talented software engineers to companies intent on creating their own systems and applications.

This approach has its disadvantages: among them, poor morale and the loss of employees to the customers they work with. So, in recent years, CSK has moved to attain more control over its projects. One goal has been to work by contract for each project rather than billing for employee time.

The company now believes, however, that the market in Japan is ready for a major transformation. Users are beginning to find out that standardized packages can be the better way. So CSK has set up new divisions and subsidiaries to develop and sell software packages. Among the operations is Computer Software Organization (CSO), a joint venture with value-added reseller Miroku & Co. CSK expects the package software market to grow by 42% for each of the next few years. It's especially well positioned to cash in on the coming AI boom, having signed up in 1984 as distributor for IntelliCorp's KEE products. In 1986, CSK posted revenues of just over ¥52 billion ($308.7 million), an increase of 15% over 1985.

Besides software development, CSK offers data entry and facility management services. It gets 11% of its revenues from leasing, a market that has tightened with the entry of several new companies. Computer sales are also substantial, contributing nearly a quarter of revenues and holding steady in 1986.

83
CONVERGENT TECHNOLOGIES INC.

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Convergent Technologies Inc. was knocked flat by shrinking contracts in 1986; the biggest blow was delivered by AT&T, which was having little luck selling the Convergent-built Unix pc: 1986 revenues of $80.5 million from AT&T were down almost 50%.

That, and declining shipments to the rest of the company's customer list, which includes Unisys, NCR, Bull Transac, and ADP, led to a loss for the year of $32.8 million, or 73 cents a share. In 1985, Convergent posted $13.2 million—or 30 cents per share—in earnings. Total revenues slipped to their lowest in three years, down by nearly 33% from 1985 to $305.8 million. This dismal financial picture forced Convergent to reduce its work force by 10% to 2,483 at the year's end.

The bad news from AT&T confirmed Convergent chairman Paul Ely in his plan to move the company away from dependency on fickle oem customers. Convergent officially broke itself into two divisions: Convergent Technologies, which continues the traditional microcomputer oem and var businesses; and Convergent Business Services, a "federation" of acquired companies that serves end-user vertical markets. Ely has said he expects Convergent Business Services to account for $300 million in sales within three years.

Although jilted at the merger altar by 3Com Corp. in March, Convergent has found plenty of other willing partners, acquiring Display Data Corp. (DDC), Hunt Valley, Md., which markets a turnkey system to auto and truck dealerships, beverage distributors, and lumberyards; Digital Systems, a Pensacola, Fla., reseller of Digital Equipment Corp. systems to accountants and contractors; and Open Systems Inc., Minneapolis, which supplies accounting systems to small businesses.

84
BOEING COMPANY

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Boeing overall had a good year in 1986. Its sales were up almost 20% to $16.34 billion from $13.64 billion, while its earnings rose 17%, to $665 million from $566 million.

Boeing Computer Services (BCS) had revenues of $1.19 billion in 1986, but most of that was from services provided internally to Boeing users. Sales to commercial users brought in $300 million, an increase of 20% over 1985.

Some of BCS's 1986 activities were based on partnerships: it announced with AT&T a joint arrangement to compete for a 10-year, $4.5 billion government contract to provide an ISDN network. A decision on this bid is expected late this year. In September, BCS formed a strategic alliance with Scientific Computer Systems Corp., San Diego, to provide operating system software for Scientific Computer's SCS-40 near-supercomputer. As a subcontractor, BCS increased its role in providing data processing, telecommunications, and information services support to Westinghouse at the Department of Energy's nuclear power facilities at Hanford, Wash.

BCS continued to provide services for the National Aeronautics and Space Administration, under a contract begun in 1985. The company also continues its sponsorship of the Technical and Office Protocol, which works hand in hand with General Motors' MAP.

An Electronics High Technology Center was established in the Seattle area by Boeing Electronics Co. to conduct advanced research aimed at technologies needed for products that are five to 15 years in the future. An ongoing emphasis on artificial intelligence led to the formation of AI laboratories in most of the company's operating organizations.

85
PLESSEY CO. PLC

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Plessey began 1986 with the threat of a takeover by U.K. electronics giant GEC still in the air and business far from booming. Its computer peripherals business continued to be a drain on resources, and telecommunications equipment orders were only marginally higher than in 1985. Plessey finished the year with income of £115 million ($170 million) on sales of £1.5 billion ($2.17 billion). DATAMATION estimates that sales of computer peripherals and datacom equipment came to £200 million ($294 million).

Much of the year's energy was spent deflecting GEC's hostile bid for the company. While the U.K. Monopolies and Mergers Commission (MMC) considered GEC's bid, Plessey considered a poison pill defense. After a long, and mostly cold, British summer, the Department of Trade and Industry (DTI) rejected GEC's bid on the grounds that any merger of the U.K.'s two largest defense contractors would be contrary to the interests of national security.

Plessey could then breathe a sigh of relief, although the DTI decision did include a recommendation that the two vendors consolidate their System X digital central office switch businesses. Neither wanted to give up management control, however, and the venture in public switching never materialized.

In the U.S., Plessey's Stromberg-Carlson subsidiary scored its first success with one of the regional Bell operating companies. In February, it landed a trial contract from BellSouth Corp.'s South Central Bell unit for a central office digital exchange. It followed up with a similar contract with Pacific Telesis. Plessey feels it needs still more long-term international business. The shake-up that started last year in the European telecommunications equipment market is not over, and Plessey must join one of the emerging consortia if it is to secure its future.

86
GOULD INC.

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Rolling Meadows, IL 60008
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Ask most people what it is Gould sells, and they'll say they don't know. But a look at 1986 reveals the answer: Gould sells divisions. The company has been ejecting pieces of itself since the announcement in 1984 of a radical five-year plan to dedicate itself purely to electronics. An understandable result of this ejection plan has been a drop in revenues—to $908.8 million in 1986 from $1.4 billion in 1984—coupled with a decline in net corporate income, with a loss of $101.8 million last year. At least Gould didn't lose nearly as much as the $175.5 million it did in 1985. Gould's dp sales, which DATAMATION estimates were $290 million, were up 7.6% over 1985, but still below Gould's dp sales in the early '80s.

The bulk of Information Systems unit sales are in minicomputers, with the rest going to image processing systems and related software. But Gould considers its brand-new NPL family of minisupercomputers its "most important new computer system ever produced, with an advanced architecture that will serve as the foundation for new systems to be introduced throughout the 1990s." The NP1, the first model, features parallel and high-speed vector processing and runs Unix. Gould also introduced MicroSel, a distributed computer system for simulation, and a new image processing system called the IP 9000.

But it was easy to lose sight of these factors when large chunks of the company were falling from its flanks. Gone are its Medical Products Group, the Mexican battery business, and all of the company's defense systems business. Also, on the way out are the French battery business and all remaining real estate assets. Perhaps most significant was the sale of the Palm Beach Polo and Country Club, which came on the heels of James F. McDonald's replacing Gould's longtime chief William T. Ylvisaker as chairman. Ylvisaker was an avid polo player and some shareholders had complained that owning the club was inappropriate.

87
MAI BASIC FOUR INC.

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In 1986, MAI Basic Four kicked off a growth campaign, seeking to add vertical software to its product roster, acquire key distribution channels, and expand its European third-party service business. Financed through a $50 million debt offering in September, the effort resulted in the acquisition of a European applications developer and computer distributor.

Spun out in 1985 from Management Assistance Inc., MAI Basic Four profits rocketed 215% to $10.4 million on sales of $287.9 million, a 15% increase from the year before. The company's financial plan, according to financial vp Frederick D. Anderson Jr., aims at compound annual growth rates in revenues and profits of 15% and 20%, respectively.

To achieve these goals, MAI Basic Four charted an aggressive acquisitions course. Leading off was the approximately $1 million purchase of Adviesbureau voor Kwantitatieve Bedrijfsanalyse (AKB), an Antwerp-based distributor of Basic Four computers in Belgium, the Netherlands, and France.

A second stop on the expansion course saw the reorganization of MAI Basic Four's field service operations. The onetime captive and exclusively international business was expanded to include the servicing of other vendors' peripherals and computers in addition to MAI Basic Four equipment. Consolidated under the name TekServ, the field service operation produced 1986 revenues of $54 million and it aims to reach $100 million by 1990, says Anderson. Overall, international customers accounted for some 60% of business and 100% of service revenue.

In software, the company's portfolio expanded via a joint marketing venture with Arthur Young & Co. The agreement gave MAI Basic Four nationwide marketing rights to software for municipal governments.

The year also saw the release of an MAI Basic Four high-end family of 32-bit computers, the MPx 9000 series. Shipments of the minicomputer systems, able to support up to 164 users, began in April; by the year's end, they made up about $30 million of 1986's bookings.

88

SONY CORP.

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Sony's dp sales were down an estimated 9% in 1986, and total revenues showed a 7% sales drop to ¥1.32 trillion ($7.86 billion) with profits off 38.3% to ¥41.9 billion ($248.6 million). With 68% of sales overseas—32.2% in the U.S. alone—the rising yen hurt. This condition particularly affected dp figures, a large proportion of which come from oem contracts for floppy disk drives with U.S. manufacturers such as Apple and Hewlett-Packard. The company has 30% of the world market for 3½-inch drives.

Although dp products represent only about 4% of sales, the company hopes to expand its role to even out the fluctuations caused by heavy dependence on consumer items. Recording and display technologies will get the most attention. Moving upscale in storage devices, the company in September presented its first hard disk drives, two 5¼-inch half-height models with a maximum formatted capacity of 40MB and SCSI interface. Optical storage was also covered with a new Motorola 68010-based write-once optical document filing system.

The color television technology that brought about high-resolution tvs has also resulted in oem sales of color monitors. In 1986, Sony's involvement with computer graphics leapt forward with the introduction of one of its most interesting dp products to date, a 68020-based Unix BSD 4.2 engineering workstation called NEWS, for Network Station. Three models, ranging in price from ¥950,000 to ¥2.8 million ($5,630 to $16,600) were available, and the company reported that its first six months' production run of 2,400 machines had been easily sold out. Other computers, such as the laptop SMC210, have done poorly.

89

LOTUS DEVELOPMENT CORP.

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Cambridge, MA 02142
(617) 577-8500

Despite a slew of new products and the acquisition of five new companies, Lotus is still best known for one product, 1-2-3: the two-millionth copy of the spreadsheet package was shipped last October. Lotus posted $283 million in worldwide revenues in '86, an increase of 25% over 1985's $225 million; however, revenue increases continue to level off: in 1984, revenues were up 196% over 1983, and 1985's growth was 44%.

Net income rose 26.4%, to $48.3 million. Non-U.S. revenue share jumped to 24% in 1986 from only 14% in 1985 as a result of eight foreign language versions of 1-2-3 and Symphony, introduced in '85, and the Japanese version of 1-2-3, which was introduced in early 1986.

Among the new products introduced in 1986, either through company acquisitions or in-house development, are T-A-C (The Application Connection), which allows micro users to access mainframe data; Lotus Metro, a business productivity program; Lotus Manuscript and Lotus Measure, the first two product offerings from the year-old Engineering and Scientific Products Division; Lotus Express, a product developed jointly with MCI that facilitates the transmission of spreadsheets, graphics, and documents via MCI Mail; and the long-awaited HAL, an add-on product for 1-2-3 that gives commands in English phrases and allows users to undo mistakes more easily. Lotus released its first CD-ROM product, Lotus One Source, a collection of financial databases updated daily. The Lotus Multi Value Plan (MVP) for customer service and support had a lukewarm reception. Lotus, conceding that MVP was "confusing," is redefining it.

Founder Mitch Kapor resigned his chairmanship in 1986; Jim P. Manzi, Lotus's president and ceo, added the title of chairman.

90

CONTINENTAL INFORMATION SYSTEMS CORP.

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(315) 437-1900

During 1986, uncertainty over tax reform didn't seem to hurt Continental Information Systems, which remarkets new and used computers as well as commercial aircraft and other big ticket items. In 1986, total revenues rose 26% to $283 million, with sales and leases of computers accounting for most of that.

Although the market for leases on new computers was soft during the year, CIS made up for it by remarketing used computers. This aspect of its business should grow in 1987, bolstered by the elimination of the Investment Tax Credit. Without it, companies have less to gain from investing in new rather than used equipment, but the real boon from tax reform for leasing companies was the imposition of the new Alternative Minimum Tax. It was designed to raise additional tax revenues by limiting the write-offs gained through accelerated depreciation of new equipment. But many companies have discovered they can still keep their taxes down by leasing instead of buying.

As tax reform giveth, it also taketh away. Sale of tax-sheltered investments to private individuals is no longer permissible. In its fiscal year that ended in February 1986, CIS relied on tax-sheltered investments to individuals for 8% of the capital it raised. Since then, CIS has sought out other funding sources, including $36 million from an offering of convertible debentures and another $15 million in a private placement with an insurance company.

CIS president and ceo Harry Goetzmann Jr. expects the new tax law to bring about a wave of consolidation among medium-sized computer leasing companies. CIS, however, is gearing up for big growth. The company expects to double its direct sales force to about 120 during 1987.

91

NOKIA CORP.

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With local strikes hurting sales in the domestic market, Finland's largest publicly traded company worked hard to develop its export business last year. Sales for the entire Nokia Group rose 9%, to Fmk12 billion ($2.4 billion), with the contribution of Nokia Information Systems (NIS) rising to Fmk1.4 billion ($273 million).

Export sales accounted for 60% of the corporate total, with NIS performing particularly well in Scandinavia and West Germany. Net corporate income for the year rose 20% to Fmk674 million ($132.9 million), chiefly the result of profits within Nokia's electronics sector. Nokia's other major divisions (cable and machinery; paper, power, and chemicals; rubber and plastics) all suffered drops in operating profits.

The company moved away from its traditional forestry business toward increased emphasis on electronics. NIS sold its service bureau and made moves into new communications markets. It set up the Matra Nokia Radiomobiles cellular telephone venture in France and took a major contract in China. Nokia's Salora-Luxor oem division, which supplies vdts and videotex terminals, fared less well.

Nokia spent the equivalent of 17% of its data processing sales revenue on dp R&D last year, with part of the money coming from shares targeted at foreign investors.

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UNITED LEASING PLC

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The British computer leasing company, United Leasing, squeezed onto the DATAMATION 100 in 1986 for the first time, with dp revenues of £182 million ($267.6 million). It will be the only time the company, as such, makes the list. Early this year, United was acquired by Inspectorate EaE Group Ltd., a U.K. subsidiary of a Swiss company called Inspectorate International SA, which has its own computer leasing operations in Europe and the U.S.

United, which was founded in 1972, has 250 employees and operates in the major European markets and in the U.S. In 1986, it maintained its dp revenues despite divestment of its microcomputer systems company United Business Systems, which was bought by U.K.-based Micro Business Systems plc. United Business Systems had contributed around £20 million to United's 1985 dp revenues.

Most of United's 1986 revenues, however, came from mainframe leasing, particularly IBM 3090 machines. By the end of September of last year, United's chairman Parry Mitchell claimed to have signed 60 contracts for the 3090 systems.

The company did well outside the U.K., too. Its U.S. subsidiary Unilease Computer Corp., helped by the changing U.S. tax laws, performed well and was ranked as the third-largest independent IBM computer leasing company in the U.S. United's French and West German subsidiaries, though smaller, also showed healthy growth rates. The West German operation "grew dramatically last year," claims a company spokeswoman. Now, the whole United operation will become part of Inspectorate, which is aiming to merge all its leasing operations in Europe and the U.S. While the merger will see the end of the old United Leasing, it will create an even bigger force in the world leasing market.

93
COMPUTER ASSOCIATES INTL.

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An aggressive acquisition program has helped this software company nearly double its revenues every year since 1983. Last year was an especially busy one as the company bought Integrated Software Systems Corp. (ISSCO), a $40 million graphics software company; Software International, which sells financial applications software for IBM and Digital Equipment Corp. computers; and the Mega Group, which sells Megacalc, a spreadsheet package for mainframe computers. ISSCO brings Computer Associates into the graphics software business. Software International's Masterpiece financial management products will be integrated with Computer Associates' Advanced Business Software products, and the Megacalc product will be combined with the company's microcomputer spreadsheet product called SuperCalc 4.

These recent acquisitions are in addition to a half dozen others Computer Associates has made in the last three years in its stated goal to provide "all of the software needs of clients." Its clients are big companies, users of IBM and compatible mainframe computers and minis and micros.

Its revenues of $264.9 million last year were up 55% from 1985's $170.4 million; earnings soared 81% to $30.5 million. These figures, the company notes, included fourth-quarter results of ISSCO, Software International, and the Mega Group.

Computer Associates, formed in 1976, was a latecomer to the business of being an independent developer and supplier of IBM systems software. Through the acquisitions and some internal development, it became a supplier of applications software as well.

The company reported spending $34.7 million on new product development in 1986, about 13% of revenues.

94
NOMURA COMPUTER SYSTEMS CO. LTD.

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Nomura Computer Systems Co. Ltd.'s problem in 1986 was that it "grew too fast" to keep things running smoothly. No matter, though: a 23% jump in revenues to ¥44.4 billion ($263 million), along with the 30% rise in the value of the yen itself, made Nomura the first Japanese dp services company to make it onto the DATAMATION 100.

Nomura Computer Systems (NCC) is the former computer division of Nomura Securities, one of Japan's big securities firms. It became independent in January 1966, and still earns 40% of its revenues from Nomura group companies, which own 5% of its stock.

Around 65% of NCC's revenues come from what the company simply calls "operations," centered around the NCC VAN (value-added network), which serves almost 5,000 customers via 40,000 terminals throughout Japan and handles as many as 12 million transactions daily. The VAN actually includes about 10 different networks, the largest of which, with 8,000 terminals, is used by the Ito-Yokado department store chain. Another is an information exchange system that connects 1,500 retailers, distributors, and manufacturers of general consumer goods, and handles ordering, account settlement, invoicing, and shipping information.

For the financial industry, NCC has a joint on-line securities information and transaction processing system called STAR-II. The largest such system in Japan, it is used by 37 major firms, including 12 of the 24 foreign companies in town, and handles 30% of the transactions on the Tokyo Stock Exchange, according to NCC. The system, along with the company, is also in the process of going international. An English language version with multicurrency and international networking capabilities, called I-STAR, has been developed.

In October, NCC opened a U.S. subsidiary, NCC-America, to establish a computer center at the Staten Island teleport in New York. That center will be linked to the system in Japan, and to the NCC-Europe center to be established later, providing an international network. The main target is Japanese securities firms moving overseas.

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PARADYNE CORP.

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This manufacturer of data communications equipment suffered through a year of deepening financial losses and continuing legal troubles related to a controversial 1981 contract with the Social Security Administration. (The legal issues arose from the firm's allegedly representing another company's gear as its own in order to win a $115 million Social Security contract.)

By March 1987, however, Paradyne had apparently settled its legal problems with the government by pleading guilty to one charge of conspiracy and by ousting Robert S. Wiggins as president and chief executive officer. His successor is Jerry Kendall, the former executive vice president and chief operating officer who has been with the company for many years. In return for the guilty plea, the government dropped bribery and perjury charges against Paradyne, freeing it to reenter the federal contract arena. In addition to paying fines and costs of $1.2 million, Paradyne settled a shareholders' suit with a payment of $8.1 million.

The fines and settlements contributed to losses for the year totaling $38.5 million. Total revenues were $261.1 million. Comparable figures for 1985 were a loss of $31.2 million on revenues of $252 million. Despite first quarter 1987 losses, the company said it was "optimistic" about this year's prospects.

Paradyne attributed the poor results to a slow economy, "continuing softness" in the datacom market, and its protracted legal battles. Profit margins, it said, were adversely affected by high costs owing to low shipment volumes, an $8.3 million write-off of obsolete inventory, product design changes, and legal fees. The company cut its payroll by 8% in an effort to cut costs.

The firm's product line includes dial-up and leased-line modems, packet switching equipment, terminals, multiplexors for T1 and slower lines, and data encryption devices. It also assembles circuit boards for other manufacturers. New products introduced last year included the Model 3210 network performance management system, numerous modems and multiplexors, and a data network offering called NetCare.

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MICROSOFT CORP.

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It was a year of significant milestones for Microsoft Corp. The company that doubled its sales and earnings two years in a row after its MS/DOS operating system was chosen in 1981 for IBM's first personal computer took these big steps in 1986: it went public, raising $45 million; moved its corporate offices to a 29-acre campus in Redmond, Wash.; finally brought out its Windows operating environment; and became the second microcomputer software concern behind Lotus Development Corp. to make the DATAMATION 100.

Microsoft's $260.2 million of revenues in 1986 soared 60% over 1985's $162.6 million. Equally pleasing were its $57.6 million earnings. (Estimates for its current fiscal year, ending June 30, are for revenues to exceed $300 million and for earnings to increase to $70 million.) Over 40% of Microsoft's business is outside the U.S.

Microsoft was formed in 1975 as a partnership by William H. Gates, now chairman and ceo, and Paul G. Allen, who has left the company to establish a new software company. It sells some 40 software products: three operating systems and six categories of applications software. It is best known for MS/DOS, the operating system it designed in 1981 that is now running on over 4 million IBM PCs and compatibles. Its Unix-based operating system, Xenix, accommodates transaction-oriented data processing on micros.

Its Excel spreadsheet software for the Macintosh computer is considered by Lotus's R&D people to be a legitimate competitor to 1-2-3. Microsoft is now developing a version of Excel for IBM's new line of PCs. But because IBM is building Microsoft's Windows into its new Personal System/2 microcomputer line announced this spring, it is with that product that the company is expected to have the most success.

Windows, which allows users to run several programs simultaneously and provides drop-down menus, icons, and mixed text and graphics, makes it much easier to use micros. With IBM adopting Windows, clone makers will be forced to offer the same capability; that is, they will have to buy licenses from Microsoft to use Windows.

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3M

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3M is having a tough time competing in information technology markets, but the giant multinational is sticking to the fight. Dp revenues dropped nearly 14% in 1986 to $255 million, following a lackluster 1985 in which dp revenues hit $295.4 million.

Even though that is an infinitesimal part of last year's $8.6 billion in total revenue, 3M considers computer technology to be a big factor in achieving its stated goal of 10% annual growth in earnings. In recent years, the goal has been consistently missed.

Dp losses stem from intense price competition in the magnetic media field with Japanese giants such as Sony and TDK. While figures aren't available from 3M, analysts say the company's videotape and floppy disk operations have lost tens of millions of dollars in price-cutting wars with the Japanese. These analysts add that 3M will stay with the magnetic media business, which has grown rapidly in recent years. Some years ago, 3M dropped its audiotape line because of Japanese competition, and two years ago it bowed to the Japanese in the copying machine market when it formed a joint venture with Harris Corp. to make copiers and facsimile machines.

Its Information Systems & Data Processing group, on the other hand, foresees a bright future with its systems for storing, retrieving, and distributing documents. 3M plans to introduce electronic document management systems, software, plain-paper reader/printers, and a film plotter that increases productivity in computer aided design.

Allan J. Huber, head of the Electronic & Information Technologies group, says dp R&D spending is increasing every year. Across the company, 3M last year spent $564 million, or 6.6% of sales, on R&D, an increase of 11% over the year before. The company also has 100 research agreements with 50 universities around the world, with government laboratories, and with other companies through strategic alliances.

3M says it made major advances in optical disk research last year. It is believed to have invested $100 million to develop and manufacture prototypes

of 5¼-inch and 12-inch optical disks. By 1990, 3M predicts, there will be a $1 billion market, growing 30% a year after that. Huber says he expects 3M to capture 35% to 40% of that market, "and in some segments more than that." The company is said to have at least a year's

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EASTMAN KODAK CO.

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Although it called the free world economy "sluggish," Eastman Kodak recorded a 9% increase in worldwide sales last year to $11.5 billion and a 12.6% rise in earnings to $374 million. (Earnings the previous year were affected by a $494 million write-off when the company was forced out of the instant photography business after lengthy litigation with Polaroid Corp.) The year was one of restructuring for Kodak: budgets across the company were slashed by 5% and 7,500 employees (6%) were cut from the payroll.

DATAMATION estimates Kodak's dp sales—including its electronic publishing business, mass storage products, and Atex Inc.—were $250 million in 1986, up 19% over 1985. The increase was primarily due to the acquisition of Eikonix and increased sales of KEEPS, (Kodak Electronic Publishing System).

In 1986, Kodak introduced an information storage and retrieval system that can access documents stored in optical disk drives or on microfilm, called KIMS (Kodak Image Management System). It makes use of 12- and 14-inch disks, Digital Equipment Corp. computers, and Hitachi Ltd. optical drives. Prices range from $150,000 to $700,000.

The company stepped up its optical disk offerings with the 6800 model of 14-inch optical storage disk. Kodak said the disk can store three to four times as much information as a 12-inch disk. Full-scale production of the 14-inch disks will begin early next year.

Kodak's Atex, of Bedford, Mass., is a supplier of computer-based editing and production equipment to newspapers and magazines. It was combined with the recently acquired Eikonix Corp. into the new Electronic Pre-Press Systems Division. Eikonix makes a digital color editing and separation system. Atex has had little revenue growth over the years and is believed to be losing money. Kodak's other data processing operation, Verbatim, a magnetic disk manufacturer acquired three years ago, was moved to North Carolina from California.

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EMHART CORP.

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Emhart Corp., a $2 billion diversified manufacturer of industrial and consumer products, entered the computer business last December when it acquired Planning Research Corp. (PRC) of McLean, Va. The 33-year-old computer-based service company reported data processing-related sales of $248.5 million in 1986, an increase of 22% over the prior year. But divestitures and heavy expenditures for new product development weakened the company's earnings. It was about to report a $2 million loss when it was acquired by Emhart early in December.

It was the 22% figure that attracted Emhart, whose growth rate has paralleled that of the gross national product, or about 2% in recent years. Last year, Emhart wrote down $150 million to streamline its operation and then paid out about $210 million for Planning Research, a company that despite its recent fast growth, has, according to its former chairman and ceo John Toups, "lacked the long-term financial stability [of Emhart]." Toups retired in February to join the Emhart board. He was succeeded as head of PRC by Wayne Shelton, a 24-year PRC employee.

In July, Shelton put the company's lagging civil engineering group up for sale, taking a $13.4 million loss. It developed a new generation of products for its realty systems group at a cost of $3.4 million, paying the bill from the earnings of its Business Information Systems operation. PRC's two other operating groups—Government Information Systems and System Services—were each doing well, winning between them nearly $202 million in new contracts.

Essentially a conglomerate of about two dozen subsidiaries and partnerships providing computer-based services and software development, PRC has always maintained a high R&D budget. The $1 million it spent in fiscal year 1986 represented a 67% increase over the previous year. It also invested $4.6 million in developing and upgrading products, an increase of nearly 75% over the year before.

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RECOGNITION EQUIPMENT INC.

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This 25-year-old company has prospered mightily through the current dp industry slump by identifying a series of market niches, all associated with data capture, and by bringing a potent blend of technical and marketing expertise to bear. Spurred by a growing demand for optical scanning equipment, Recognition Equipment Inc.'s net profits soared some 163% to $11.3 million and sales jumped 51% to $246.6 million over the calendar year.

Over the past three years, the company has more than doubled its size through acquisitions, a changing product mix, and an increased customer service orientation. REI's strategy has been to buy an installed base, both as prospects for a broadening product range increasingly based on an open Unix architecture, and for the lucrative ongoing service business. One very large customer, the Federal Reserve, for example, pays some $400,000 a month for maintenance of its currency processing systems, according to one REI insider.

REI's maintenance and repair business grew 66% to $115 million—almost half the company's total revenue. During the year, as part of an internal program known as Redirect, the Field Engineering Division was renamed Customer Service and given a much broader mission, including the selling of supplies, contract programming, and a myriad of other hand-holding services—all as part of a "partnership" drive with the customer base.

Recognition has enjoyed a tenfold increase in its customer count over the past three years, most notably through the acquisition in late 1985 of five European marketing subsidiaries of Mohawk Data Sciences. These operations in Belgium, Denmark, France, Sweden, and West Germany became profitable in 1986 and helped boost European sales to 38% of the total at the end of the company's fiscal year (late October). REI also beefed up its Far East operation, and successes in Australia and Japan helped raise Asian revenue to 8% of the total, from 2% in 1985.